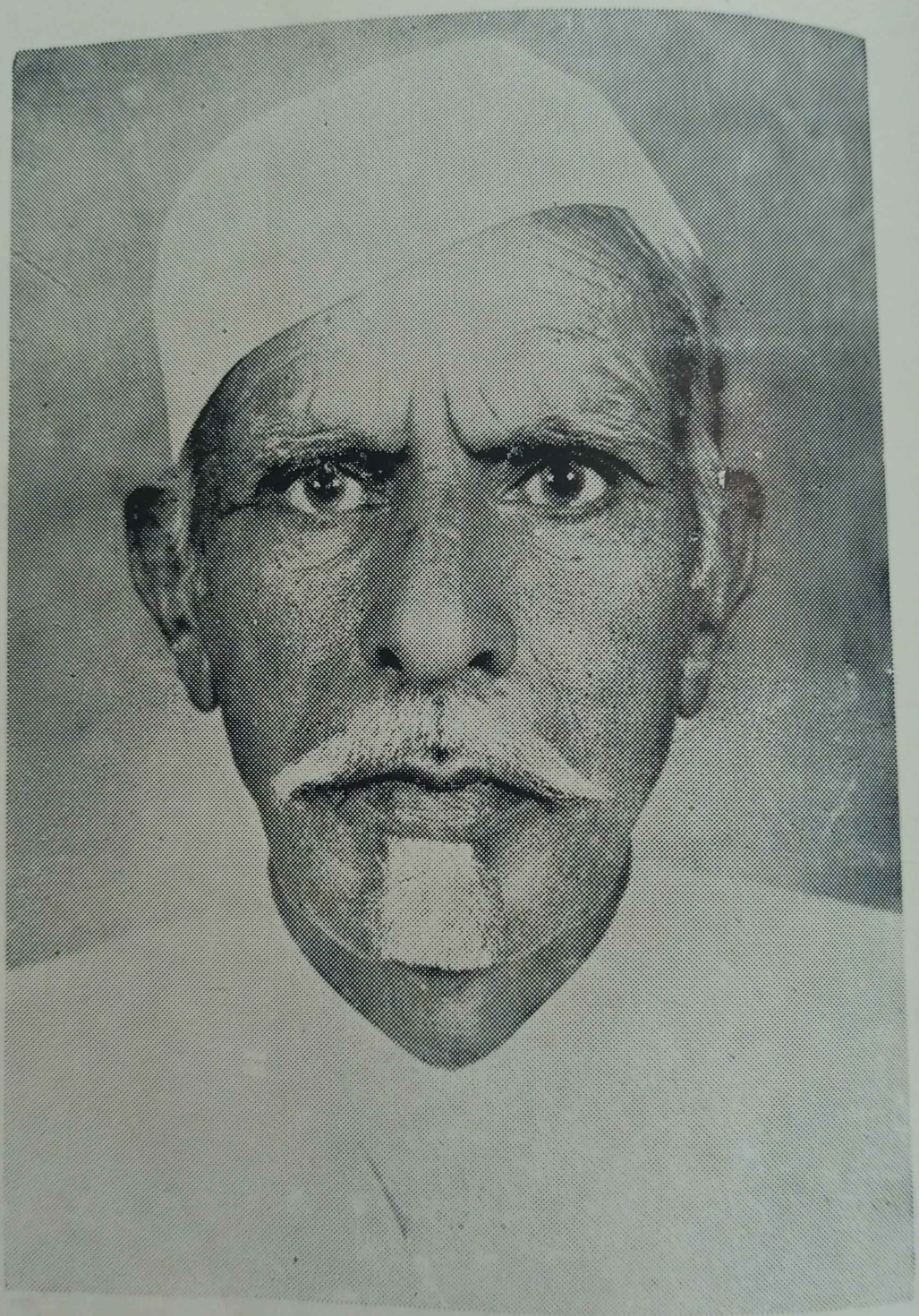
GEOGRAPHY OF JAMMU & KASHMIR STATE

This book is dedicated to the memory of
my father-in-law



MANZOOR AHMAD

who was a staunch believer of 'Almighty' and whose love and affection always inspired me in my academic pursuits and life.

GEOGRAPHY
OF
JAMMU & KASHMIR STATE

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The University of Kashmir

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VICE-CHANCELLOR

June 3, 1986

Foreword

The State of Jammu and Kashmir is a fascinating geographic region including a unique blend of natural and cultural characteristics. There are very few systematic and faithful accounts of this state. Prof.Majid Husain's book on Systematic Geography of Jammu and Kashmir State fills this vital gap and provides valuable information and analysis on the physical, economic and social aspects. In this book the author reveals a rare understanding of the physiographic and socio economic setting of the state and presents a rational account which is marked for vividness and clarity. The whole book is written in a simple style which even an undergraduate will find easy to understand and comprehend. I do hope that the lead given by Prof.Majid Husain will be followed by other geographers and we shall soon have a series of works on the geographical characteristics of the State of Jammu and Kashmir.

(Prof.S.Manzoor Alam)

PREFACE

The present work 'Geography of Jammu and Kashmir State' provides a systematic account of the northern most state of the country which has great diversity in its Physiography, ethno-cultural milieu, economy and over all geographical personality. The work incorporates three sections. namely, (i) physical setting, (ii) social personality, and (iii) economy of the state.

The Part First of the book opens with a brief discussion on the geological history, physiographic features and major drainage systems of the State. Chapter 2 gives a vivid account of the prevailing weather and climatic conditions and their impact on the agricultural operations, cropping patterns and occupations of the people of Ladakh, Jammu and Kashmir Divisions. The flora and fauna, major soil groups have been discussed in the Third Chapter, while Chapter Fourth deals with the mineral resource base of the State, their spatial distribution and utilization.

The social personality of the State discussed in Part II of the book includes chapters on peopling, major ethnic groups, transhumance, growth pattern of population, demographic attributes, urban centres and the process of urbanization.

The last Part of the book gives an insight into the economy of the State and occupational structure of the people. The agricultural systems, industries, tourism, transport and trade of the State have been described systematically in this section.

The book written in an easy and cogent style, it is hoped, will be of immense help for the teachers and students of geography as well as for the general readers who are interested in the habitat, economy and society of the Jammu and Kashmir State.

In a work of this nature an author must rely extensively upon material already published, and the present work is no exception. List of material consulted by the author and which might with profit be studied by the reader where possible are given at the end of each Chapter. The author expresses his sincere thanks to all those scholars whose work have been consulted in the preparation of the present book.

Professor. S. Manzoor Alam, Vice-Chancellor, University of Kashmir, Srinagar inspired the author for writing a systematic geographical account of the Jammu and Kashmir State for which he feels highly indebted. The initial plan of the book was discussed with Professor C.D. Deshpande during his stay in the Department of Geography and Regional Development, University of Kashmir in 1985, who not gave

valuable suggestions about the framework of study. For all his guidence I must express my sincer gratitutes to Prof. C.D. Deshpande.

The Cartography of maps and diagrams was done by Miss Ghadir Fatima and Mr. Khurshid Anwar, Dept. of Geography & Regional Development for which the author expresses his sincere thanks. Thanks are also due to Mr. A.M. Wani and Mr Mukhtar Ahmad for their assistance in the form of photographic work. The author is also indebted to Dr. Mohammad Aslam Islahi, Reader Dept. of Arabic, and his colleagues and students who provided a congenial atmosphere to complete the work in record time.

My thanks are also due to my family members, especially to my wife, whose patience has made possible the labour necessary in the prepration of this work. Grateful mentions should also be made of Javed Alam, Shagufta Bano Husain and Mansoor Majid whose diligence in their studies inspired me to concentrate on the task seriously.

Mr Mohammad Siddique Dar, University of Kashmir also deserves thanks who typed much of the manuscript efficiently. Mr. M.L. Gupta, publisher, *Rajesh Publications, Daryaganj, New Delhi* took the task with a sense of commitment and dedication which were crucial in the publication of the book in record time. The author express his gratitudes to the publisher and his designer for the jacket cover of the book.

In spite of valuable suggestions from learned scholars, there are imperfections. In order to overcome the shortcomings of the present volume, comments from teachers, students and experts will be welcomed so that the subsequent editions may be improved.

February : 1987

Majid Husain

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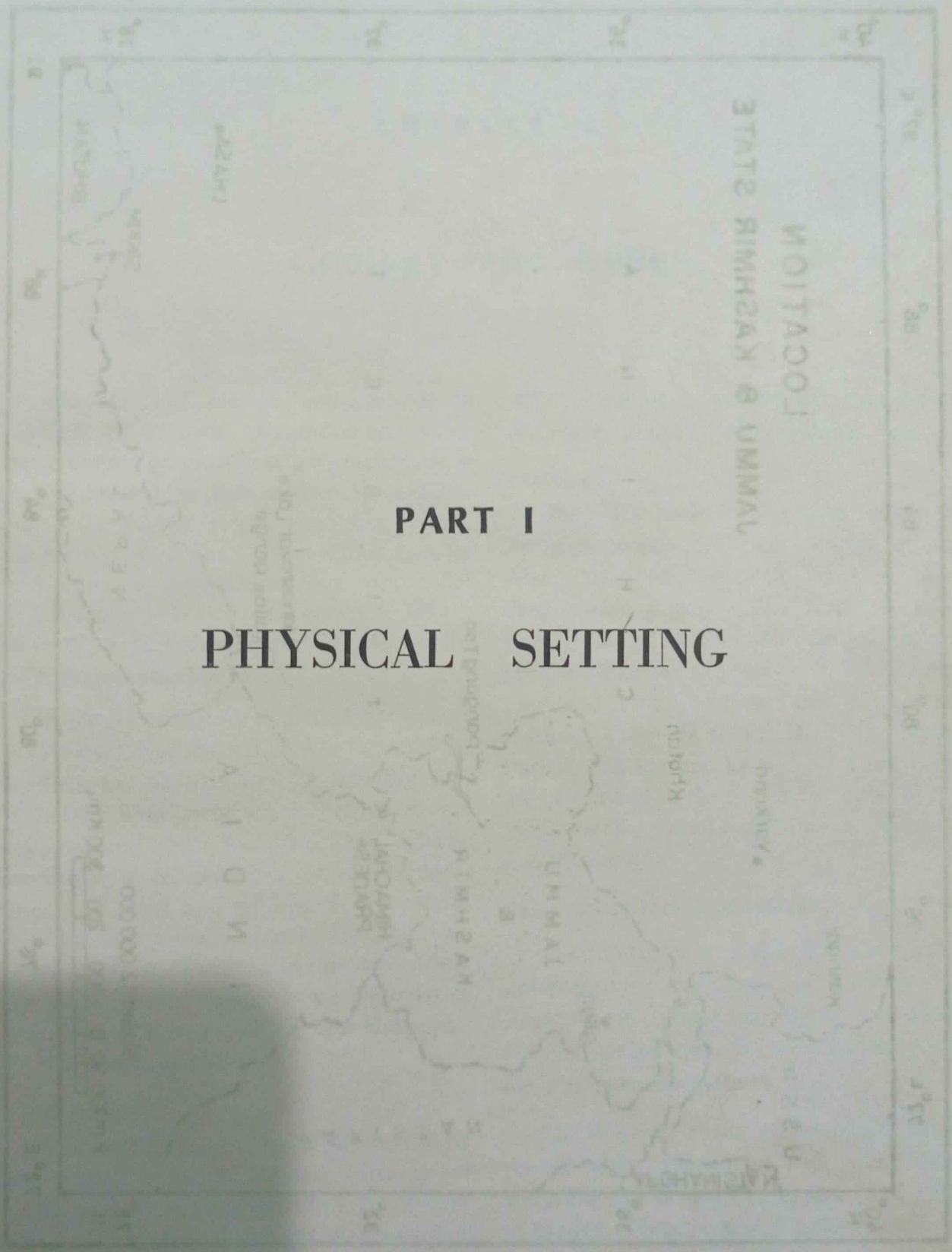
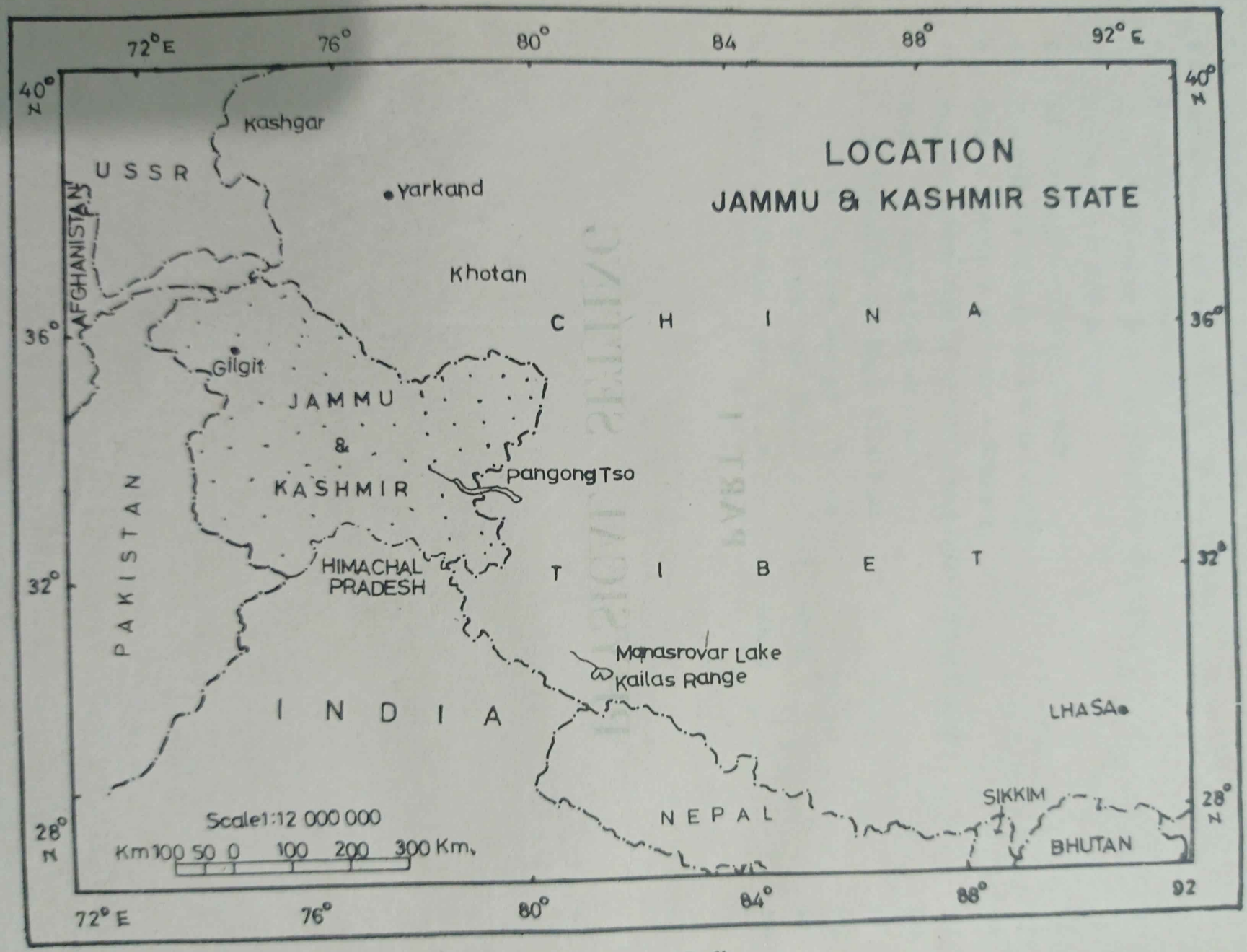


PART I

PHYSICAL SETTING



Based Upon Survey of India map

Fig. 1

CHAPTER — I

Geology and Relief

The state of Jammu and Kashmir - a symbol of national integration and unity has a unique geographical personality. It is well endowned in renewable natural resoures. Its mighty rivers, evergreen forest, snow covered peaks, invagorating climate and humane population are unparallel in the country. It stretches between 32° 17′ N to 37° 6′ N latitudes and 73° 26′E to 80° 30′E longitudes (Fig.1)

The state of Jammu and Kashmir comprisinig the Divisions of Ladakh, Jammu and Kashmir has an area of 2.22 lakh Sq. Km. including those parts which are under the occoupation of Pakistan and China. According to the census of 1981, its population was about 5.95 million. It is bounded by Tibet in the east, China and Afghanistan in the north ane Pakistan in the west, while the southern and south-eastern boundaries are formed by the Punjab and Himachal-Pradesh states of India.

Stratigraphy :

The state of Jammu and Kashmir carries one of the finest developed sequence of rocks right from Archaen Era to Recent Age. The spatial distribution of rocks of different geological periods has been described chronologically in the following paras.

Archaen :

The oldest rocks of the earth crust are Archaen which are also known as the Precambrian, but sometimes used to older Precambrian rocks. The Archaen rocks (locally called as Salkhala Series) include granites, gneisses and schists. These rocks are found in the north-western parts of the Kashmir Valley (Karnah District), Nanga Parbat, Zanskar and Ladakh. These rocks are also found in the Southern parts of Pir-Panjal in the vicinity of Ramban, Kishtwar and Bhadarwah.

Palaeozoic (Dravidian Group) :

The Palaeozoic rocks are extensively developed in the State of Jammu and Kashmir The Palaeozoic rocks are divisible into the Silurian, Devonian, Carboniferous and Permian Systems.

The Silurian rocks consisting of sandy shales, shale, sandstone, and yellow-limestone are found near Aishmuqam and parts of Liddar Valley in Anantnag District.

The Devonian rocks lie conformably over the Silurian rocks on both flanks of Liddar as thick beds of quartzite, known as Muth quartzites. Rocks of this age are also found on the southern flanks of Pir-Panjal.

Carboniferous System named from the widespread occurrence of carbon in the form of coal in these rocks. The carboniferous rocks lie conformably over the Muth-quartzites of Devonian age in Aishmuqam, Kotsu. Panjal - range, Zanskar - range and Banihal valley.

The upper system of Palaeozoic is known as Permian. The Permian rocks are composed of shale, dark arnacious-shales and limestone. These formations are found in Pir-Panjal, Upper Sindh, Lidder Valley (Kashmir Division) and Katra to Poonch in Jammu Division.

Mesozoic - Era :

The period of 'middle life' comprises of Triassic, Jurassic and Cretaceous systems. The Mesozoic was preceded by the Palaeozoic and followed by the Cainozoic Eras. The most spectacular elements of Mesozoic faunas were the giant reptiles.

The Triassic formations are found in the Sindh Valley, Liddar Valley and northern slopes of Pir-Panjal Range.

The Jurassic System is named from the Jura Mountains France. The fauna of Jurassic was extremely diverse and varied. The dominant terrestrial animals were the dinosaurs, which reached their maximum size in the Jurassic and occupied most of the ecological niches. The flora of the Jurassic included many forms still living at the present day such as conifers and ferns. The Jurassic formation is found in the Valley of Banihal.

The Cretaceous System has been derived from the Greek word 'Creta' means 'chalk' During this preiod there had been a wide spread of marine transgression. The rock formations of this period are found in Astor, Burzil, Dras and Ladakh.

Cainozoic Era :

The Cainozoic Era succeeds Mesozoic and ends at the Quaternary Period. It is commonly used as a synonym of Tertiary. It comprises of the Eocene and Recent Pleistocene Systemes. The Karewa uplands bordering the valley of Kashmir and river terraces fall of Jhelum, Chenab and Ravi came into existence during the Eocene period. The new alluviums of these rivers fall in the Recent Period of Cainozoic Era.

Geomorphic Features :

Morphologically, the state is divisible into three distinct regions i.e. Jammu, Kashmir and Ladakh, Each of the three regions has distinct physiographic features, Nevertheless the administrative boundaries donot conform to the physiographic boundaries. On the basis of physiography the state is divisible into :—

(i) The Outer-Plains
(ii) The Siwaliks
(iii) The Middle Himalayas
(iv) The Valley of Kashmir
(v) The Greater Himalayas
(vi) The Plateau of Ladakh

The Outer Plains (Andarwah and Bajwat) :

The State of Jammu and Kashmir in the south is rimmed by an alluvial plain of the Chenab, Tawi and Ravi rivers and their

tributaries. In width it varies from seven to thirty kilometres. It sprawls in the southern parts of Akhnoor, Ranbirsinghpura, (R.S Pura), Samba and Kathua. This Plain constitutes a part of the Great Plains of India and resembles the landscape of Punjab. The height of this highly productive plain veries between 325 to 350 metres.

Being in the south of the Siwaliks, the outer plain of the Jammu Division is traverssed by the numerous hill torrents locally called as *Khads*. These torrents remain dry over the greater parts of the winter and summer seasons and attain enormous size during rains. At the occurrence of rains, the ravines achieves the shape of gushing torrents and it becomes difficult to ford them. Occasionally at the occurrence of floods these torrents transport massive quantities of sand, red silt, pebbles and shingles. The channels of these torrents are characterised by clumps of reed growths locally called as *Khar*.

The outer plains of Jammu are highly fertile and the temperatures permit the cultivation of crops throughout the year. In tracts like Ranbirsinghpura which have been provided with adequate canal and tube-well irrigation, two staple (rice and wheat) and a fodder crop are grown in a year. It is this part of the state in which High Yielding Varieties (HYV) of wheat and rice have been diffused successfully and Green Revolution is a big success.

The Siwaliks :

To the north of the Jammu Plains for a distance of about 200 Kms. between Ravi and Jhelum rivers stretch the youngest mountains of the Sub-continent i.e. Siwaliks. The width of Siwaliks is between 20 to 50 Kms. and height between 600 to 1220 metres above the sea level in the State of Jammu and Kashmir.

The slopes of Siwaliks facing the outer plains are gentle covered with deciduous forests, evergreen bushes and numerous scrubs. The northern slopes have steep slopes with thin cover of vegetation. In the Siwaliks to the east of Jammu city are situated the Mansar and Saruinsar lakes at an elevation of about 600 metres.

The undulating slopes, adjacent to the plains upto an elevation of 300 metres between Ravi and Chenab rivers are locally known as *Kandi*. The *Kandi* land is characterised by numerous torrents soils and scarcity of water. Conseqeuently, agriculture in *Kandi* areas is exclusively dependent on rains. The rate of soil erosion during rainy season is heavy. The people (Gujjars) practice cattle keeping mixed with maize, pulses and oilseeds cultivation. Economically, this is the most underdeveloped part of the state in which the Gujjars and other people are living at a poor level of subsistence.

The second largest city of the state and the summer capital Jammu is situated at an altitutde of 366 metres on the southern slope of Siwaliks along the banks of Tawi river.

In beween the Siwaliks and the Lesser Himalayas lie the longitudinal valleys locally known as *Doons/Duns*. The important *Doons* are Basoli, Ramkote, Dansal, Udhampur and Sundarbani. These fertile valleys have a high concentration of population.

The Middle Himalayas :

The Middle Himalayas locally known

as *Pahar* (mountain) in Jammu Division sprawl between the Ravi in the east and the Poonch in the west, though they continue towards north-west beyoned Muzaffrabad. In elevation they vary between 1,820 m. to 2,240 m. The Middle Himalayas have a width of about 60 Kilometres in the eastern parts of Jammu Division which decreases to only about 10 Kilometres near Rajouri,

The Middle Himalayas in general have an east-west extension. From the ridge, however, a number of side ridges and spurs radiate in all directions. At Tanger,a branch ridge runs due south-west. It is the Trikuta Mountain which have limestone strata. The sacred cave of *Vaishno Devi* is situated in a peak of Trikuta Mountain.

Several important rivers e. g. Tawi, Manawar-Tawi, Basantar and Ujh have their sources in the Middle Himalayas. The rock strata of Middle Himalayas is dominated by sandstone, shale, and light-yellow limestone of Miocene Murree System and Eocene deposits.

The southern slopes of Middle Himalayas are covered by forest. In the high altitudinal zones *Deodar* (oak), blue-pine and silver-fir dominate, while in the areas of low heights i.e. below 1,800 meters, the monsoon deciduous forest and scrubs are dominate trees.

The Jammu-Srinagar National Highway has been carved out through the Middle Himalayas which crosses this system at Patni-Top Pass at an altitude of about 1950 metres

Excepting the river terraces and river-valleys, cultivation of crops is not an important economic activity in Middle Himalayas. The people are dependent on forestry lumbering, herding, cattle keeping and tourist industry.

The Valley of Kashmir :

The Valley of Kashmir often been termed as 'the Paradise on Earth' is famous for its lakes, clear streams, green turf, magnificent trees, mighty mountains, cool air sweet-water and highly productive soils growing paddy. apples, almonds, and saffron.

The Valley of Kashmir, nestled in north-western folds of the Himalayas is surrounded on almost all sides by mountain ranges, chareterised by snow covered lofty peaks. The mountain range rising to a height of 5,550 metres on the north-east, dip-down to about 2,770 metres in the south, where the Banihal-Pass (Jawahar Tunnel) affords an exit from the Valley. Owing to high elevations there is a continuous ring of snow around the Valley upto the end of May and sometimes by the beginning of October. The only outlet for rivers is the Baramulla-Gorge where the placid Jhelum river leaves the smooth grassy banks and hurries headlong down its rocky course to the plains of the south.

The oval shaped valley is filled with thick deposits of alluvium which has blanketed even the lower slopes of the surrounding ranges. It is drained by the Vitatsa (Jhelum) and its tributaries, among which Liddar, Indus, Pohru, Sandran, Bring, Vishav and Sukhnag are prominent. The Valley is about 130Kms. long and 40 Kms. wide.

On the basis of stratigraphy and altitude, the Valley of Kashmir, may be divided into the following physiographic units.

(a) The Jhelum Valley Floor :

The Jhelum Valley floor includes the

flood pladins and *Bahil* (loamy) tracts. The Valley floor sprawls from Khanabal (Distt. Anantnag)in the south-east upto Baramulla in the north-west. The region has rich deposits of alluvium, deposited by the Jhelum and its tributaries. Consequently, it is known as 'The Rice-Bowl of Kashmir'. The valley is the hub of economic activities. The agricultural landscape is dominated by paddy and orchards. The Valley floor has an elaborate road transport system and enormous potential for tourist development. Almost all the urban places (23 towns) of the Kashmir Division are situated in the Jhelum Valley region.

(b) The Karewas *(Wudars)* :

The *Karewa* formation is a unique physiographic feature of the Valley of Kashmir. *Karewas* are flat topped or undulating surfaced mounds on the sides of Jhelum flood plain, flanking the surrounding mountain precipices. These are lacustrine deposits and sprawl over an area of about 13 to 26 kms. on the left flank of Jhelum. On the right hand side of the river they are however, not contiguous and have the shape of tableland. *Karewas* are also found in the Handwara and Sogam in the shape of isolated tracts (Fig. 2).

Though the *Karewas* are found on both sides of the Jhelum, they are more pronounced on the left flank of the river. The *Karewas* of Mattan, Naunagri, Zainapura, Bijbahera, Barapur, Khampur, Nagam, Damodar, Khushipura, Hanjak, Badgam, Chhundpurah, Mukhhamah and Zirah are famous. These *Karewas* are situated in Qazi-gund, Kulgam, Koyul, Pampore, Islamabad, Mattan, Tral, Bijbahera Khushipura, Safapore, Handwara and Bandipore tehsils.

The *Karewas* have deep underground watertable and owing to undulating terrain hey are not adequately irrigated.

The *Karewas* have great economic and agricultural inportance. Commercial and cash crops like almond, walnut, apples, peaches, pears and saffron flourish luxuriously in the *Karewas*. The higher reaches are generally under maize cultivation while the flat topped levelled areas are devoted to saffron, wheat, mustard and rapeseeds. Saffron is a perennial cash crop which on the average gives returns for about fifteen years. Interculture of saffron and orchards is an emerging pattern of crop land use in *Karewas*.

(c) The Side-Valleys :

The Valleys of the major tributaries of Jhelum have been termed as the side-valleys. These valleys have relatively steep gradient owing to which the insolation rate is low and winters are severe. The soils are immature and deficient in humus contents. Paddy cultivation is confined to the flat irrigated fields, while undulating terraces and *Kandi* tracts are devoted to maize and paddy cultivation. Side-valleys like Sindh, Naranag, Liddar and Daksum are occupied by Gujjars who are largely dependent on pastoral activities.

(d) The Greater Himalayas :

The Greater Himalayas in the State of Jammu and Kashmir lie to the north of Kashmir Division and to north-east of Jammu Division. They separate the Valley of Indus from that of the Jhelum river.

In the state the Greater Himalayas are known as Zanskar. The average altitude of Zanskar range is about 5940 meters.

The rivers of Zanskar and Sura drain the slopes of Zanskar and merge into the Indus river. The area has most severe climate and as low as —40°C temperature is recorded at Dras during the Winter Season. Moreover, owing to heavy snowing, it remains cut-off from rest of the state from November to April. The growing season is short and the people generally keep goats sheep and ponies for their sustenance. In summer they grow vegetables and coarse grains.

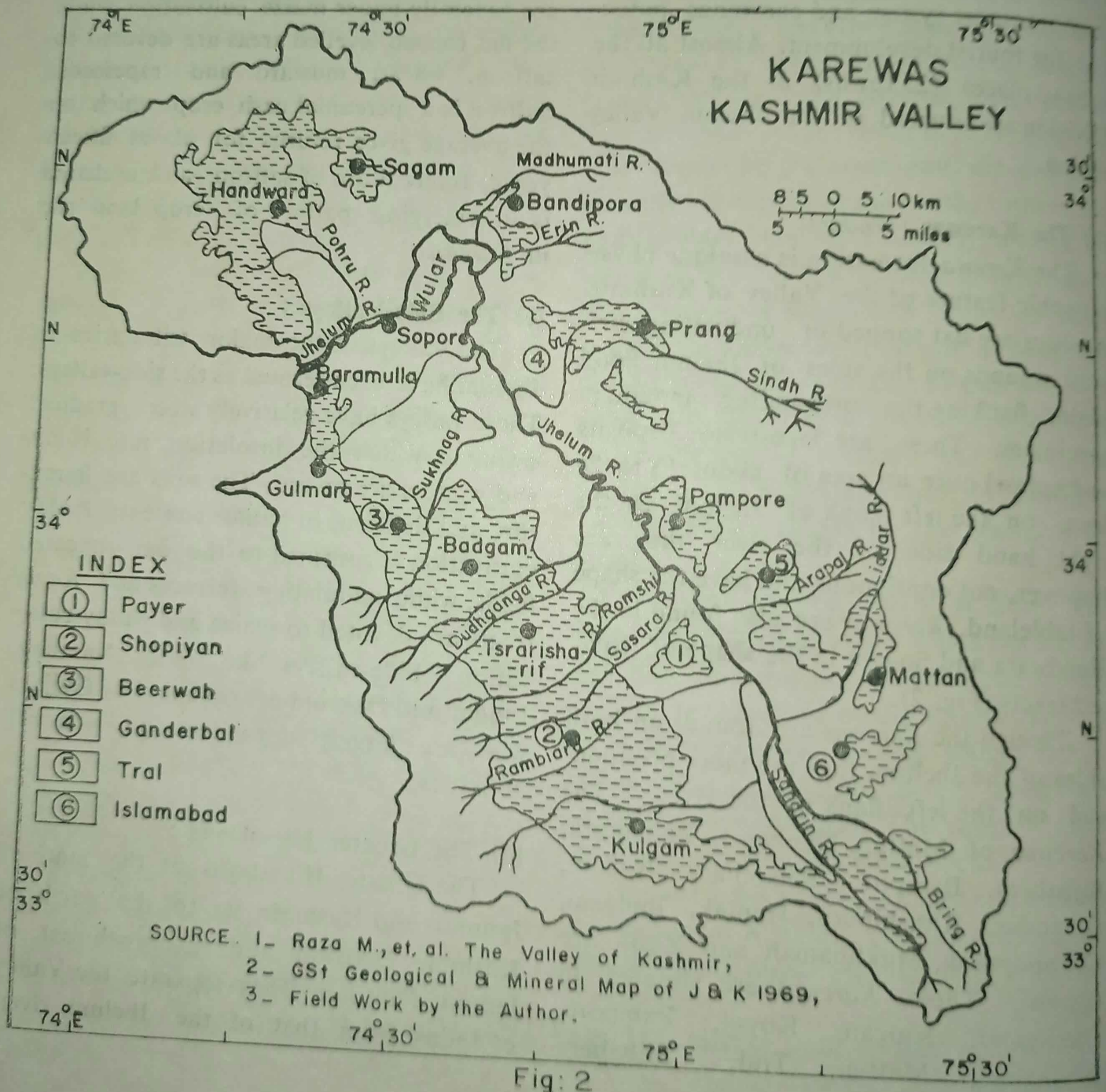


Fig: 2

Ladakh Region :

Ladakh constitutes the northern most administrative unit of the State. It is a vast arid table-land located at a height of 5,000 metres. This cold- desert is mostly formed of mechanically weathered rocks and granite dust. It is deprived of vegetation and often been termed as the 'Roof of the World' where people live at heights ranging between 2.800 to 5.000 metres above the sea level.

The mighty Indus flows through Ladakh. It is flanked by the Ladakh - range on the right and the Zanskar-range on the left. The scanty rains and arid conditions are not conducive for agricultural activities and therefore, cultivation of crops is restricted to the irrigated terraces of Indus-River. Settlements are sparsely distributed and their population size is small. Pastoral, and tourism are the main economic activities of the people of Ladakh.

Leh, the Divisional Head Quarters is situated on the right bank of Indus at an altitude of 3,505 metres, on an alluvial fan which has a sprawl of 8 Kms. The environs of Leh are highly productive and wherever irrigation has been developed, good crops of *grim* (a type of wheat) fodder, barley and vegetables are obtained.

In the northern parts of Ladakh, lies the Karakoram Range, radiating to south-eastern direction from the Pamir-Knot. Some of the loftiest peaks of the Himalayas e.g. K_2 or Mt. Godwin Austen (8,610M) are situtated in the Karakoram Range. K_2 is the second highest peak in the world after Mt, Everest. Some of the largest valley glaciers are also found in the Karakoram Range. The Saichen-glacier—about 72 Kms. in length, and Baltore, Hispar, Rimo, Baifa, Batuna are the important valley glaciers of the northen Ladakh.

Drainage :

The State of Jammu and Kashmir is drained by the mighty Indus, Jhelum Kishanganga, and Chenab rivers and their tributaries. Out of the three, the Indus and the Chenab rise well to the north of the Greater Himalayas and they pierce through the main ranges of the Himalayas. The Jhelum has its origin from the Pir-Panjal.

1. The Indus :

Rising in the vicinity of Mansarowar-Lake from Sengge-Khambab Glacier, the Indus flows in a north - westerly direction through the trough between the Kailash and the Ladakh ranges. It is 709 Kms. long within India and drains an area of 117,844 Km^2. It flows for nearly 320 Km. in a north-westerly directions when it crosses on the south-eastern boundary of Kashmir at an elevation of 4,500 m. Flowing in the same direction it falls to 3,500 m at Leh. About 19 Km. in the same direction it is joined by the Shyok on the right bank. Near Skardu the Shigar joins on the right. Giligit river joins on the right further down. Here the river bed is 1,220 m above the sea level. The river then flows west, crosses the Kashmir border and turns south, southwest into Pakistan.

Indus, though flowing through gorge has numerous alluvial fans and river terraces. The town of Leh is situated on an alluvial fan. To the east of Leh, on either bank of the Indus is an alluvial plain stretching over a distance of 30 Km. This is the most fertile levelled land sprinked with several

rural settlement of the Ladakh region.

The flows in Indus are subject to extreme variations.. The maximum flow is in summer. The low winter flows are mainly from the ground storage built up during summer. Thus a drought in winter can follow a flood in summer.

The Jhelum :

The Jhelum rises from the Pir-Painjal range near Verinag. Initially the river flows in a northwesterly direction and after passing through the city of Srinagar merges into the Wular Lake. Emerging from the Wular Lake, it takes a south westerly direction which it pursues upto Baramulla. It finally passes into Pakistan through the Baramulla-Uri Gorge. The Jhelum flood plain is 1,585 m. above sea level.

In India it is 400 Kms. long and drains 28,490 Sq. Km. On its right it is joined by the Bring, Liddar, Harwan. Sindh, Erin, Madmati and Pohru rivers, while the left bank is joined by Sandran, Vishav, Rembiara, Dudganga and Sukhnag rivers. The maximum and minimum discharges of Jhelum recorded near Indo-Pak border are as under :

Site	Maximum discharge	Minimum discharge
Near Indo-Pak border	29,600 m^3	112 m^3

3. The Kishanganga River :

Kishanganga is an important tributary of the Jhelum river. It has its origin in Kishan -sar Lake and therefore been named as Kishanganga. It drains the Tilail, Burzah-Bal, Gurez and the surrounding regions. It merges into the Jhelum river near Muzaffarabad.

4. The Chenab River :

The Chenab is the mightiest river of the State. It has its Source in the glaciers of Middle Himalayas. At the Source, the river is in the two streams, the Chandra and the Bhaga at an elevation of about 4,900 m. in Himachal -Pradesh. After the confluence, the river flows between the Himalaya and the Pir-Panjal-Range and then takes a turn to the south through a gorge, crossing Pir-Panjal. It flows between rocky mountains till it enters the plains near Akhnoor. The Chenab in the State is 1,180 Km. long and its basin in India is 26,755 Sq. Kms. The maximum and minimum discharges of the Chenab river is given below :

Site	Maximum discharge	Minimum discharge
Near Indo-Pak border	15,400 m^2	102 m^2

The rivers of Jammu and Kashmir State constitute a potential source of wealth if properly harnessed and used. A systematic knowledge of the hydrology of these rivers is essential for the purpose. It is perhaps the first step necessary in the planning and development of water resoruces of the State.

REFERENCES :

Law, B. C. 1968 *Mountains and Rivers of India.*

Wadia, D. N. *Geology of India*

Raza, M. et. al 1979 *The Valley of Kashmir* de Terra and Patterson

Mittal, R.S. 1968 'Peuysiographical and Structural Evolution of the Himalayas in B.C. Law (ed.) *Mountains and Rivers of India.*

CHAPTER—II

Climate

The everage weather conditons of sizeable area of the earth's surface over a period of time is known as climate while the conditions of the atmosphere at any place at a specific time or for a short time is known as weather.

The State of Jammu and Kashmir is situated in sub-tropical latitudes, but owing to orographic features and snowclad peaks, the climate over greater parts of the state resembles to that of mountainous and continental parts of the temperate latitudes. There are, however, micro-level variations in the general prevailing weather and climatic conditions of the state. A detailed study of climate at the micro level, in the absence of reliable temperature and precipitation data is not possibie. The general climate of the state can be understood easily by describing the weather conditions of different seasons of the Jammu Division, Kashmir Division and Ladakh Division separately, which have been described in the present chapter.

Jammu Division :

The southern parts of Jammu Division, being for the most part contiguous with the plains of Punjab, has the tropical heat characterised with monsoon rains and cool winters.

The climate of Jammu Division, barring the high mountains and leeward slopes is characterised by a rhythm of season which is caused by the reversal of winds in the form of the south-west and the northeast monsoons. The pressure reversal takes place regularly twice in the course of a year. The south-west monsoon in Jammu Division extends from mid-June to October, and corresponds with the rainy season (*Barsat*), while the northeast monsoon extends from November to mid-June. Thus taking into cosideration the temperature and rainfull a year in the Plains of Jammu Division and the southern hilly tracts of the Divivion is divisible into three distinct seasons (*Mausam*) :

(i) The cold weather season (November to February,
(ii) The hot weather season (March to Mid June),
(iii) The season of general rains (Mid-June to mid October).

The Cold Weather Season :

During the month of November a high

pressure belt extends over the Ganga-Sutlej Plains. Owing to pressure distribution and the influence exerted by the Himalayan relief the prevailing direction of winds in this season is from west to east. The mean minimum temperature in the month of November at Jammu reads about 12°C, but the mean maximum temperature remains about 26°C. The month of December records further decrease in day and night temperatures, occasionally going below freezing point, while the meam maximum reads about 22°C (Fig. 3)

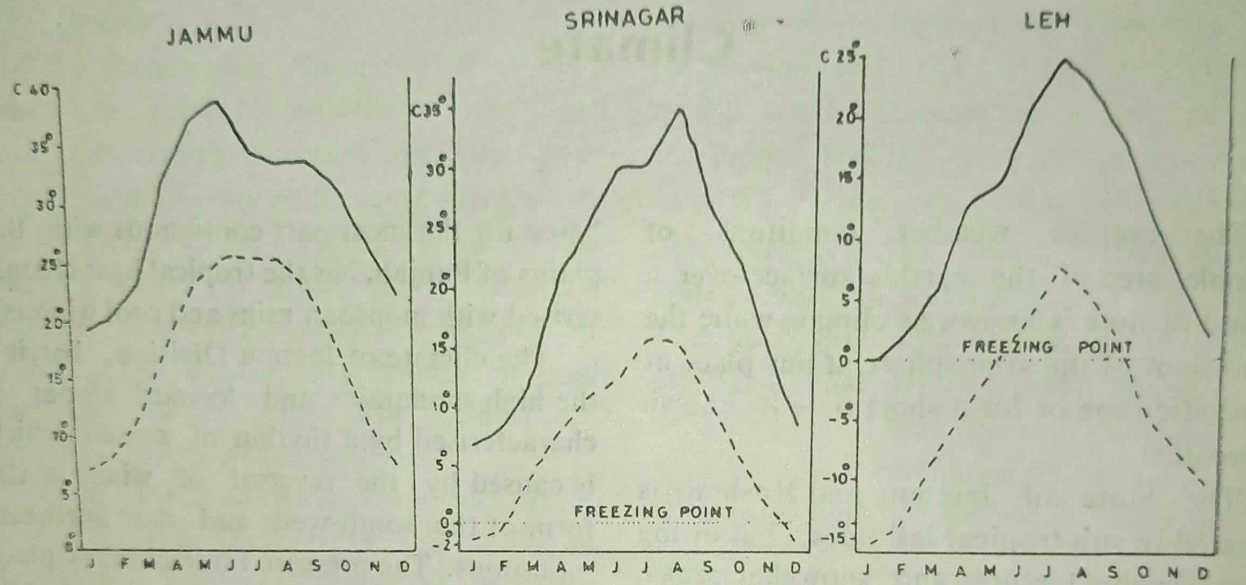

JAMMU
SRINAGAR
LEH
FREEZING POINT
FREEZING POINT
J F M A M J J A S O N D
J F M A M J J A S O N D
J F M A M J J A S O N D
Mean Maximum Temperature
Mean Minimum Temperature

Fig. 3 Fig. 4 Fig. 5

January is the coldest month of the year (Fig. 3). It records the lowest temperatures, the mean monthly temperature being about 13°C (Fig. 6) and the relative humidity 68 per cent. Occurrence of mist and fog locally known as *Dhund* and *Kohra* respectively is common in the morning hours. Intense frost is also observed in the month of January, which affects the crops of mustard, rapeseeds wheat, sugarcane, vegetables and chillies adversely. Irrigation of *Rabi* crops at such occasions is imperative to protect them. February records an incrsase in the day and night temperatures. This is the beginning of spring in the Jammu region when new leaves appear on deciduous trees like, *Shisham*, *Neem* and *Jamun*. During the cold weather season, the western disturbances (temperate cyclones) accompaied with moderate to intense rainfall pass over the Jammu Division. These depressions (Temperate Cyclones) have their origin in the Mediterranean Sea. The timely occurrence of rainfall in winter season is highly beneficial to the standing *Rabi* (winter) crops. The temperate cyclones are occasionally accompanied by hailstorms which result into considerable damage to the *Rabi* crops of (wheat, grain, mustard,and vegetables) and flowering trees of mangoes, peaches and plums. The total

rainfall in the winter season at the Jammu Rainfall recording station is about 13 cm (Fig. 7).

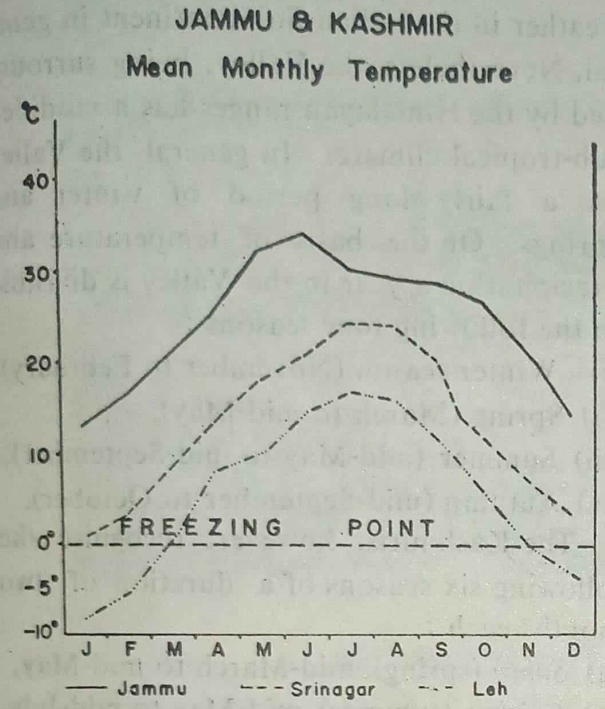


Fig. 6

The Hot Weather Season (March to mid-June)

March to mid-June is the period of hot weather season in Jammu Division. March records an abrupt rise in temperature with a continuous fall in pressure. In this month the mean monthly temperature at Jammu is 18°C (Fig.6). The mean minimum and mean maximum temperatures read 23°C and 12°C respectively at Jammu, but going up into areas of higher altitudes there is a corresponding decrease in the mean maximum and mean minimum temperatures. The increase in temperature continues in April and May. The month of May experiences the highest temperature of the year (Fig. 3). The mean maximum and mean minimum temperatures during this month read about 38°C and 23°C respectively. At Jammu, in the month of May, usually the days are hot and the nights are warm. The relative humidity ranges between 20 to 40 per cent, which is the lowest in the year.

In the month of May and early parts of June, in the plain region of Jammu the surface becomes parched under the impact of intense heat. During this period, hot dry winds locally called as *Loo* blow which

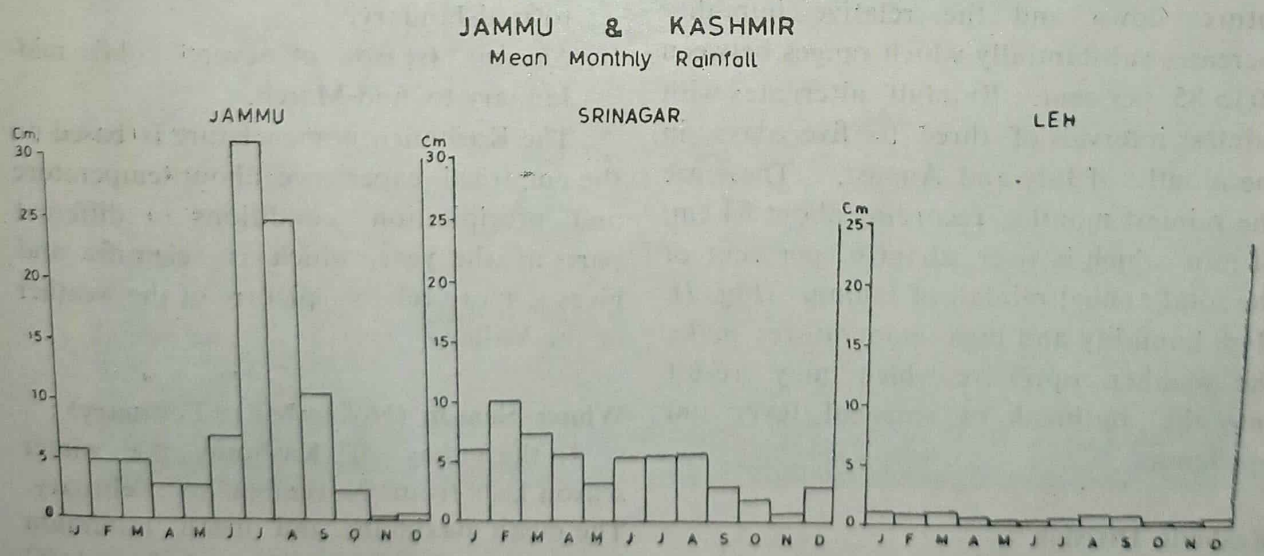


Fig 7 Fig 8 Fig 9

damage the standing crops of sugarcane, vegetables and fodder. To protect these crops from intense dry heat, they are regularly irrigated, wherever irrigation facilities are available. The occurrence of duststorms locally known as *Andhi* is a unique feature of this season. The duststorm is characterised by a huge cloud of dust which reduces visibility to a few metres. The duststroms are however, short lived and may result into light drizzles, which modify the weather making it pleasant for one or two days. In Jammu Division, the total average rainfall in the summer season is small (Fig. 6). The rainfall recording station of Jammu records about 11 cm. of rainfall during summer season (April- June).

The Season of General Rains (Mid - June to October)

The season of general rains in the Jammu Division begins in the middle of June, with the outburst of clouds. It lasts till the middle of October, The arrival of summer monsoon rains brings the temperatures down and the relative humidity increases substantially which ranges between 60 to 85 per cent. Rainfall alternates with rainless intervals of three to five days in the months of July and August. These are the rainiest months, recording about 64 cm. of rain which is over about 67 per cent of the total annual rainfall of Jammu (Fig. 7). High humidity and high temperatures make the weather opressive which may result into the outbreak of seasonal fever and epedemics.

Kashmir Division :

The Valley of Kashmir has continental climate, characterised with marked seasonality. In fact, the genesis of Kashmir weather is intrinsically linked with the mechanism of weather in the Indian Sub-continent in general. Nevertheless, the Valley, being surrounded by the Himalayan ranges has a modified sub-tropical climate. In general the Valley has a fairly long period of winter and springs. On the basis of temperature and precipitation a year in the Valley is divisible in the following four seasons :

(i) Winter season (November to February),
(ii) Spring (March to mid-May),
(iii) Summer (mid-May to mid-September),
(iv) Autumn (mid-September to October).

The Kashmiris, however, recognise the following six seasons of a duration of two months each :

(a) *Sonth* (spring) mid-March to mid-May,
(b) *Grishm* (summer) mid-May to mid-July,
(c) *Wahrat* (Rainy season) mid - July to September,
(d) *Harud* (Autumn season) mid-September to mid-November,
(e) *Wand* (Winter season) mid - November to mid-January,
(f) *Sheshur* (season of severe cold) mid-January to mid-March.

The Kashmiri nomenclature is based on the empirical experience about temperature and precipitation conditions in different parts of the year, which is scientific and gives a more reliable picture of the weather of the Valley.

Winter Season (November to February) :

In the Valley of Kashmir, the winter season lasts from November to February. The mean maximum and mean minimum temperatures in November read about 14°C

1. An Overview of Frozen Dal Lake—January 1986.

2. Believe it or not-Imprints of Motor-Bicycle on the Frozen Surface of Dal-Lake-Jan. 1986

and 1.5°C. In December, there is a further decrease in temperature, the mean minimum being about-1.4°C and the mean maximum 8°C (Fig. 4). In exceptional years of severe cold, e.g. January 1964 and last week of December, 1985, the thermometer read-15°C. Consequently, most of the lakes including the Dal and Wular were frozen and became the playing grounds for the adventorous sportmen of Srinagar.

January is the coldest month of the year in Kashmir which is locally known as the period of *Chilla-Kalan* (period of snowy cold). Occurrence of heavy snow in the Valley in this month is a common feature. The non-occurrence of snow and precipition, it is believed, leads to various epademic disease and scarcity of water in the rivers during the subsequent seasons.

The maximum snow occurs in the month of January. On the average the three months of December, January and February receive about 120 cm of snow, out of which about 50 cm (41.58 per cent) is recorded in the month of January.

In winters, in the Valley of Kashmir rainfall occurs from the western disturbances, also known as the temperate cyclones. These disturbances as stated at the outset have their origin in the Mediterranean Sea. The rainfall generated by these cyclones is fairly widespread. There are however, variations in the rainfall recorded at the different stations of the Valley. For example, the city of Srinagar records about 30 cm of rainfall during winter season (Nov.-Feb.), while rainfall during the corresponding period at Baramulla and Anantnag is 35 cm and 34 cm respectively. Winter rainfall is much higher on either extremity of the Valley, Doru (45 cms) in the north-west receive much higher quantities of rain than that of Srinagar. In general, the Valley has highly dreary and monotonous winters with very little sunshine. The relative humidity is generally over 90 per cent during this season. To combat cold the people use *Pheran* (a loose woollen garment), *Kangri* (earthen fire pot) and *Bukharis* (indeginous room-heater). In winters, the consumption of *Balan* (fuelwood) is enormous. The Kasmiris spent a substantial portion of their earnings in the purchase of fuelwood and coal to be used in winter season. During this period the agricultural activities remain suspended leading to unemployment. Consequently, many of the labourers and small farmers out-migrate from the Valley to the relatively warmer parts of the country to seek employment and to pass their winters.

Spring Season :

At the advent of March the weather starts improving and the temperatures start moving up steadily. The snow starts melting, but snowing may take place even in March. In 1983, there had been heavy snowing in the last week of March. March is a fairly wet month of the year. The frequency of western disturbances is high. Srinagar records about eight cm of rainfall in this month (Fig. 8).

In March the day temperature fluctuates between 10°C to 16°C. Wide variations are, however, observed from place to place and year to year. The mean minimum temperature remains around 3°C as a result of which the nights are cool. The weather becomes further inclement at the occurrence of snow and rains.

The day temperature in April and May shoot up abruptly. The night temperature also registers a steady increase. In May, the mean maximum and mean minimum temperatures read about 25°C and 12°C respectively (Fig. 4).

About 30 to 40 per cent of the total annual rainfall is recorded during spring season, while rainfall recording stations like Pulwama and Handwara receive about 35 to 45 per cent of their mean annual rainfall. Spring rain is often associated with violent thundersqualls and hailstormes which damage the almond and apple orchards adversely.

In the spring season with the steady increase in temperature, lush green grass develops over the surface and leaves appear on the dermant vegetation. Leaves generally appear on willow and poplar as early as the last week of March and on *Chinar* (maple) in the first week of April. This is the period when the Valley is in full bloom and the almond, apple, peach and pear flowers add more fragrance to the fresh air of the Valley. Agricultural activities which remain suspended during the long winters are again started in April and May. The seeds of vegetables are germinated in the houses in April to be transplanted in the *Radhs* (floating gardens) of the Dal lake and the *Damb* fields. Ploughing of paddy fields and swing of rice nurseries also commence in the early parts of May.

Summer Season :

June to September is the period of Season in the valley of Kashmir. The mean monthly temperature of June at Srinagar reads about 22° C Fig. 6. July is the hottest month in which the absolute temperatures on a particular day may shoot upto 37°C. The mean maximum and mean minimum temperature in this month being about 30°C and 15°C respectively. Under clear skies and rarified atmosphere this temperature is very oppressive. July and August are the month when electric fans are needed and the well off residents of Srinagar plan their outings for Gulmarg, Pahalgam and other hill stations which record relatively low mean maximum temperatures.

June to September is the period of summer monsoon in the Sub-continent of India, but the Valley of Kashmir receives relatively less quantity of rainfall during this season. The Pir-Panjal Range obstruct the inflow of monsoon winds in the Valley. Consequently, less than one-fourth of the total annual rainfall is recorded in this season (Fig. 8).

The high temperatures of June and July help in the rapid sprouting and development of paddy and vegetable crops. These conditions also help in the ripening of *Glass* (cherry), peach, pears and early varieties of apples.

Autumn Season

September and October are the months of autumn season in the Valley. These months mark a transition from the warm sub-tropical summers to temperate winters. Autumn is characterised by least disturbed weather. In this season the skies generally remain clear, the duration of sunshine is longer and very little precipitation is recorded. It is perhaps the most enjoyable weather in thc Kashmir Valley, which

3. Cutting of Ice in Dal Lake—Dec. 28, 1985.

4. Shikara—A Boat in Summer—A Sledge in Winter.

Table 2.1

Jammu –Mean Maximum, Mean Minimum Temperatures and Average Monthly Rainfall.

	J	F	M	A	M	J	J	A	S	O	N	D	Average/Total
Mean Maximum Temp. °C	19	20.2	23.4	32.2	38.1	38.0	34.2	33.5	33,6	31.9	26.4	22.2	29.39
Mean Minimum Temp. °C	6.7	8.4	11.9	18.1	23,0	25,3	25.1	24.8	22.4	17.5	12.3	7.7	17.19
Rainfall in cm	4.5	4.0	3.1	2.4	1.1	7.5	27.5	25.0	12.5	4.6	0.8	3.3	96.34

Table 2.2

Srinagar—Mean Maximum, Mean Minimum Temperatures and Average Monthly Rainfall

	J	F	M	A	M	J	J	A	S	O	N	D	Average/Total
Mean Maximum Temp. °C	5.8	8.1	12.1	20.9	24.6	29.4	29.6	28.9	27.1	22.1	14.4	8.2	19.27
Mean Minimum Temp. °C	–1.6	–0.5	3.00	8.1	11.2	15.0	18.2	17.5	10.8	5.6	1.6-	–1.4	7.29
Rainfall in cm.	10.2	18.3	20.2	5.3	8.6	3,5	11.3	3.7	1.3	1.5	0.8	1.0	84.7

Table 2.3

Leh—Mean Maximum, Mean Minimum Temperatures and Average Monthly Rainfall.

	J	F	M	A	M	J	J	A	S	O	N	D	Average/Total
Mean Maximum Temp.°C	0	2.8	6.8	13.1	16.4	20,8	24.5	22.8	18.7	11.8	6.7	2.8	12.27
Mean Minimum Temp. °C	–1.6	–13.8	–8.7	–4.1	0	3.1	7.2	5.6	1.2	–5.1	–8,1	–11,2	–4.24
Rainfall in cm.	0.39	0.32	0.28	0.23	0.22	0.18	0.48	0.60	0.28	0.1	0.04	0.03	3.15

Source : Metrological Deptt. New Delhi.

attracts enormous number of tourists from within and outside of the country.

In September, the mean maximum and mean minimum temperatures read about 25°C and 11°C. At the occurrence of cloudes, the temperature however, slumps abruptly. During the last fifty years October recorded snowing five times in Srinagar. In October the diurnal range of temperature is quit pronounced (Fig. 4).

The cool nights and warm days of September and October help in the ripening of walnut, almond, apples and the later parts of October are conducive for the emergence of saffron flowers. It is the period when the people collect and purchase *Balan* (fuelwood) for the ensuing winters and harvest the numerous varieties of apples. The farmers generally arrange the wedding of their children in autumn after the harvest of paddy, saffron and orchards.

Ladakh Division

The climate of Ladakh and Zanskar is very cold, arid and dry. In winters, temperatures are extremely low in Rupsho, the higher plateaus above Tansktse, Rong and Zanskar, while central Ladakh and Nubra possess a comparatively mild climate.

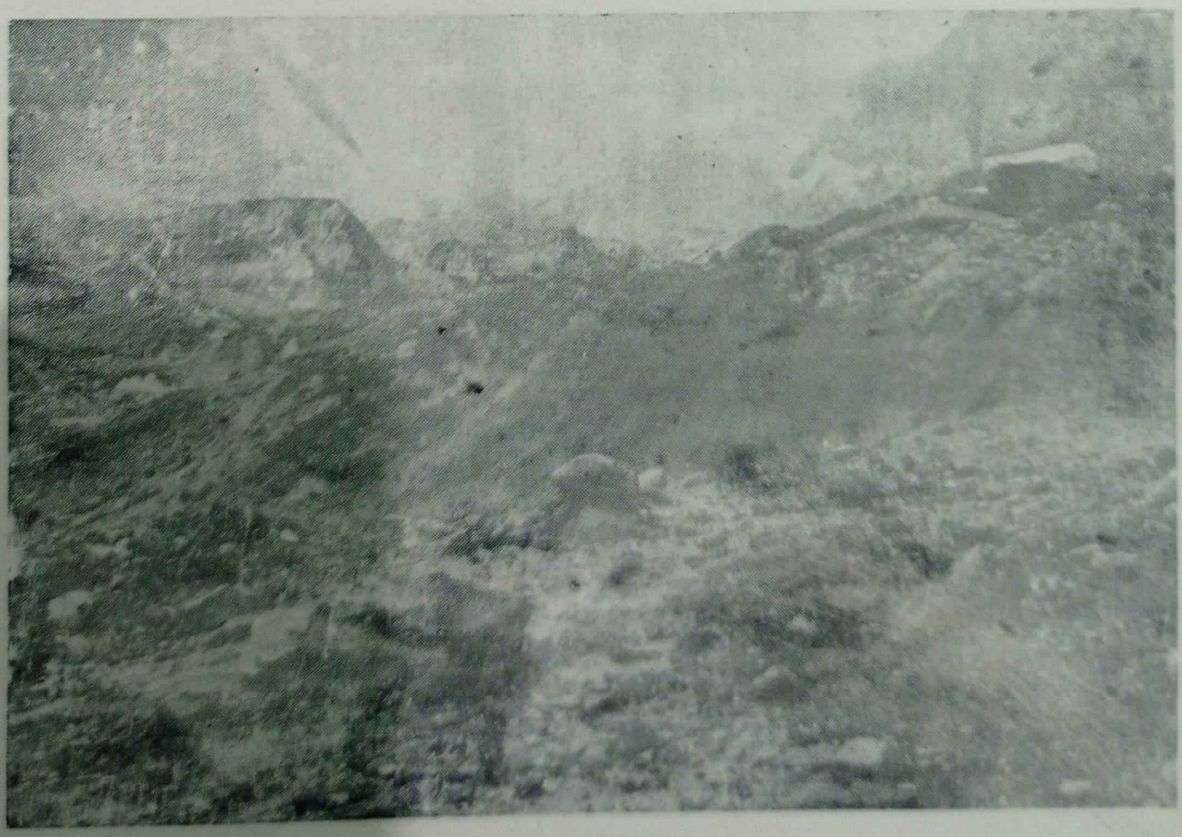
Temperature data available from Leh reveals that the mean maximum and mean minimum temperatures in July read about 25°C and 7°C respectively (Fig, 5). In this season the diurnal range of temperature is significantly high, being about 18°C. Under the rarified atmosphere, the heat in the day is intense and there remains large difference in the sun and shade temperatures. On a particular day the mean maximum temperature may read upto 38°C which may cause sun-burns to the people who work in the fields. In January the mean minimum temperature remains below freezing point reading as low as—16°C at Leh and—40°C at Dras. In January of 1986 the mean minimum temperature went down as low as—48°C at Dras. It is interesting to note from Fig. 5 that in nine months September to May at Leh the night temperature remains below the freezing point. In Ladakh (Leh) the annual range of temperature is about 25°C. The skies are generally clear and insolation very intense. Winds, however, blow with steady speed and are potential sources for the generation of wind-energy.

The average annual rainfall is only about 20 cm at Leh, most of which is received in the months of January, March and August (Fig. 9). Snowfall is also recorded in the various parts of Ladakh in winters. The snow that falls in winters becomes so powdery that it is swept from the flat roofs of houses with brooms. The ice-crystals, under the extreme low temperature conditions acquire a highly crystalised shape. The dry weather and sever winters are the major constraints in the cultivation of crops and development of agriculture. In the fertile irrigated tracts, however, good crops of cereals, fodder and vegetables are harvested during summer season.

REFERENCES :

1. H. Flohn, 1958 "Recent Investigations on the Mechanisms of Summer

5. Harmukh Glacier—About 85 km. North of Srinagar.



6. Parkhachak Glacier—Suru Valley, Ladakh.

Monsoon of Southern and Eastern Asia," *Monsoons of the World*. IMD, New Delhi. PP. 81.

2. M. Raza, et.al. 1978. "*The Valley of Kashmir*" New Delhi, PP. 61-81.

3. A. N. Raina, 1971 *Geography of Jammu and Kashmir*, New Delhi.

4. S. N. Bhan, 1956 "Snowfall at Srinagar" *Ind. Jour. Met. Geophysics* VII, PP. 295-300.

5. D.A. Mooley, 1957 "The Role of Western Disturbances in the Production of Weather over India during Different Seasons", *Ind. Jour. Met. Geophys.* VIII, PP. 253-260.

6. R. K. Dutt and M. G. Gupta, 1967 "Synoptic Study of the Formation and Movements of Western Depressions", *Ind. Jour. Met Geophys*, XVIII, 1, PP. 45-50.

7. Monkhouse, F. J. et. al. 1973. "*A Dictionary of the Natural Environment*, London.

CHAPTER — III

Natural Vegetation and Soils

Natural vegetation now usually taken more widely to mean all vegetation not deliberately organised or included in farming activity, and includes 'wild' or semi-natural vegetation. Contrary to this all types of vegetation altered or modified by man directly or indirectly is called cultural vegetation.

The State of Jammu and Kashmir is well endowed in forest resource. Its natural vegetation has great diversity in flora, ranging from the lush-green *Margs* (Alpine-pastures) to evergreen conifers on the gentle slopes of high altitudes, and from scrub-jungles of the food-hills to the deciduous foreste on the southern slopes of the Siwaliks and Pir-Panjal Range. The vegetation of the state has undergone a drastic change. Large tracts of forests have been removed through continuous felling of trees to bring more area under plough and pastures.

Forests have numerous productive, protective and bio-aesthetic functions. On the average the forests of Jammu and Kashmir yield 617,310 cubic million of timber and 120,300 cubic million fuelwood annually. Moreover, they fetch about Rs. 35 crores annually to the State revenue. According to the statistics of 1984, the total forest cover of the state was about 20,175 sq. km. The forest area in the different Divisions of the state has been given in Table 3.1.

Table 3.1

Jammu & Kashmir State-Forest Area 20175 sq. kms.

Sl. No.	*Division*	*Area in sq. km.*	*Percentage*
1.	Jammu	8123.99	40.27
2.	Kashmir	12039.89	59.68
3.	Ladakh	11.12	0.05
	Total	20175.00	100.00

Source : Forest Statistics Division, J & K, 1984

Table 3.1 vividly shows that nearly 60 per cent of the total forest area of the state lies in Kashmir Division and the remaining 40 per cent in Jammu Division, while Ladakh Division has only 11.12 sq. km. (0.05%) under forest which may be taken as insignificant.

The sprawl of forests and the species of trees found therein are directly influenced by the lithology, rock-structure, altitude, aspect of slope, insolations and the general edaphic and geo-ecological condition. The influence of these factors is quite pronounced in the State of Jammu and Kashmir. Consequently, there is great heterogeneity in the flora of the state and marked variation in their density and spatial distribution. The concentration and distribution of forests in the state has been given in Table 3.2.

An examination of Table 3.2 shows that the district of Doda with 26.78 per cent of the total forest area of the State is a largely forested district. Baramulla (12.41 per cent) Anantnag (11.34%) and Udhampur (11.29%) are the other leading districts which have substantial area under forest. The areal units of fertile plans have large tracts under arable lands and therefore, forest area in such districts (Badgam, Pulwama, Srinagar, Kathua, Poonch) is significantly meagre. Tha higher altitudes and latitudes of the

Table 3.2

J & K State - Area under Forest - Districtwise

Sl. No.	*District*	*Area in Sq. kms.*	*Percentage*
1.	Anantnag	2289.21	11.34
2.	Badgam	429.65	2.12
3.	Baramulla	2504.83	12.41
4.	Kupwara	1479.68	7.33
5.	Pulwama	1008.76	5.00
6.	Srinagar	411.86	2.04
7.	Doda	5403.27	26.78
8.	Jammu	1445.49	7.16
9.	Kathua	789.25	3.96
10.	Poonch	825.53	4.09
11.	Rajouri	1296.40	6.42
12.	Udhampur	2278.69	11.29
13.	Kargil	11.20	0.05
14.	Leh		
	Total	20173.74	100.00

Source : Forest Statistics Division J & K (1984)

state involve more topographic and geo-ecological complexities than the plains of the Jammu Division, as a result of which forest species and their density differ from slope to slope with in a small distance. In general the southern slopes of Pir-Panjal have thin cover of vegetation while the northern sheltered slopes are covered with thick conifer forests. Ladakh is almost devoid of vegetation excepting the moister strips of rivers which are characterised with stunted trees cedar, willows and fir.

The great heterogeneity in the geo-ecological, pedological and climatic conditions of the state as stated at the outset have resulted into great diversity of fauna. Over 4,000 species belonging to 1500 genera are found in the State. For a systematic study the vegetation of the Jammu and Kashmir State may be classified broadly under the following types:

(i) Sub-Tropical Forests :

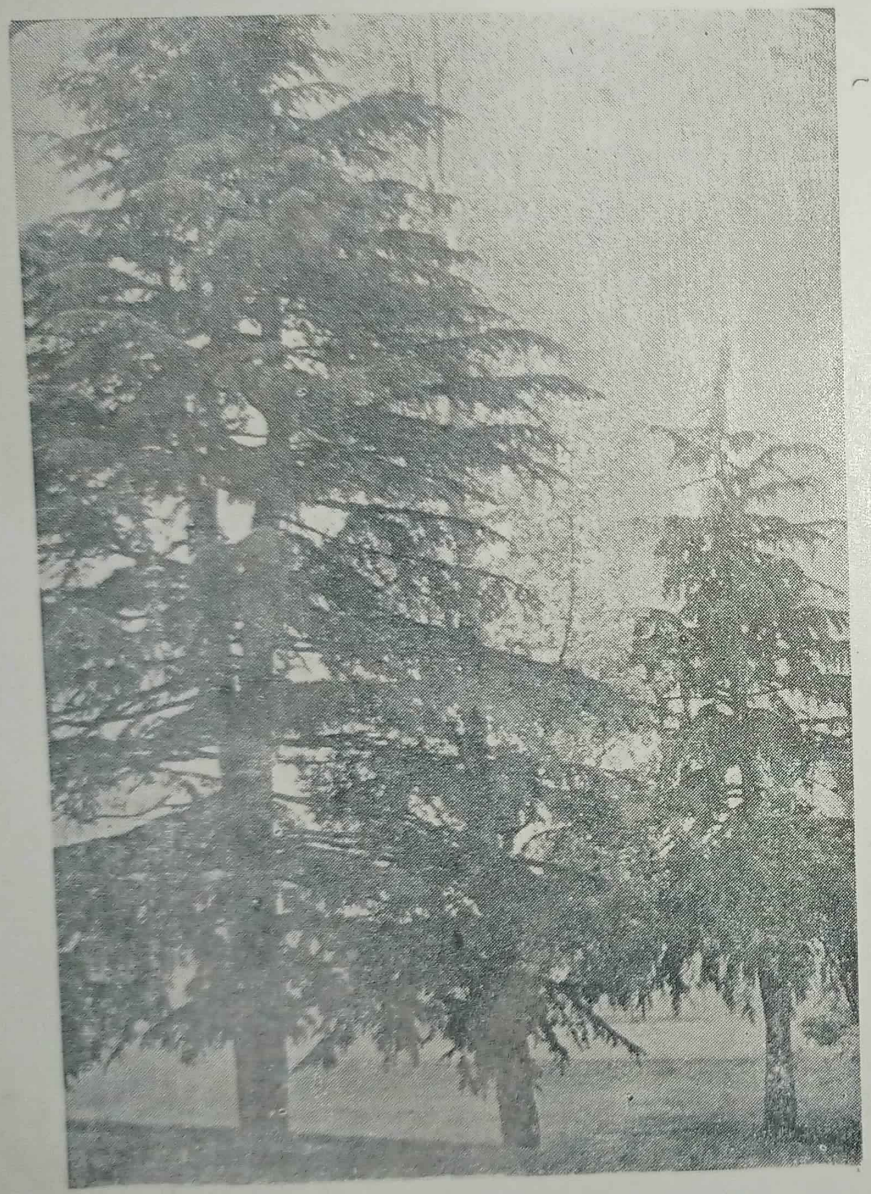
The southern parts of the Jammu Division with an elevation below 1500 metres, have the sub-tropical vegetation. A great variety of vegetation is found in this zone on account of edaphic factors. These forests have a thick undergrowth of bushes and scrubs. The dominant species of this zone are *Shisham,Neem* (Azadirachta Indica) *Pipal* (Ficus religiosa), *Tun, Kikar, Babul* (Acacias Arabica), *Khair* (Acacia catechu) thorny bushes, evergreen shrubs, climbers and tall grasses locally called as *Khar*. Most of these species are board leaved deciduous type which drop their leaves in the months of January, February and March before the advent of hot weather season. Apart from fuelwood, these forests are utilized for the roofing of houses, agricultural implements timber. Valuable products like resin, *Katha* and medicinal herbs are also obtained from these forests.

Temperate Forests

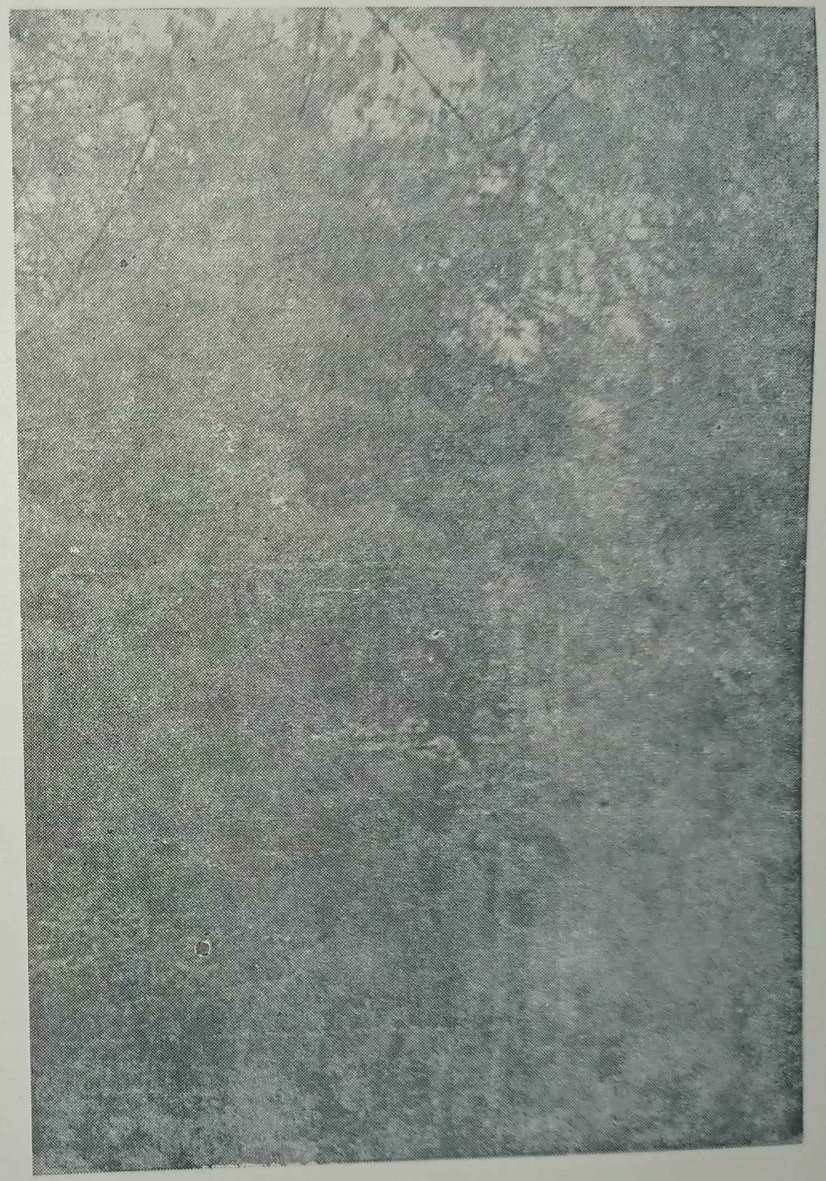
Going northward as the latitude and altitude increase the place of sub-tropical forest is taken by temperate vegetation. The slopes of Pir-Panjal and Zanskar above 1500 m. to 3000 m. are dominated by coniferous vegetation, the dominant species being *deodar (Cedrus Deodara)*, Pine *(Pinus)*, Silver-fir *(Abies Alba)*, spruce (Picea), laural, elm, and paper-birch (Burza).

The northern slopes of Pir-Panjal have the dominance of *deodar*, blue-pines with deciduous shrubs, while the Jhelum forest division (stretching over Gulmarg and Lolab Valley) is dominated by cedar, fir and spruce species of conifers. In the flat valley of Kashmir, poplar, *Chinar* (a type of maple). Vir (willow) are the main species of vegetation which are deciduous in character.

Most of the species are utilized for fuelwood and timber. The conifers are of great economic importance. These forests produce good quality of timber and paper pulp. The most valuable timber, that of *deodar* has been depleted and now confined to the north-west corner of Kashmir Division. The system of farming-out timber to contractors has resulted in the destruction of many fine forests. The tracts which the contractors have spared have suffered at the hands of the Gujjars who with small axe cut down trees partly for the sake of



7. Deodar (Oak) the Green-gold.



8. Pines—the Major Source of Fuelwood and Timber.

fuelwood, foddar and partly from a kind of natural instinct which impels him to make forest clearings for the sake of grass. Moreover, the inadequacy of hydel and thermal electricity and the sever cold in winters have put the people in a position which tempt them to cut trees and their twigs. This accelerated rate of felling of trees is leading to the extinction of *deodar*, spruce, pine and fir. The over exploitation of forests and the use of costly wood for fuel is doing great harm to the state revenue on the one hand and the ecosystems on the other. In fact, many of the ecosystems have lost their resilience characteristics.

(iii) Alpine Pastures (Margs)

This vegetation zone lies between 3,600 to 4,000 m and begins well above the upper limit of conifer forests. Being the zone of high altitudes the climate in alpine pastures is extremely cold over the greater parts of the year. The low temperatures support some dwarf birch and junipers making a shrubby appearance. The stunted trees merge into vast pastures, locally known as *Margs* (alpine-meadows). In these pastures some shrubs form isolated thickets during summer months (June-August). The green and nutritious grasses of alpine pastures are utilized and grazed by the Gujjars and Bakarwals who practice trans-humance. These people ascend with their goats and sheep and occupy them in the month of May. They stay there upto the middle of September, depending on the prevailing temperature and precipitation conditions. In winters they descend and migrate with their flocks to the zones of lower altitudes of Jammu Division to pass their winters.

(iv) Xerophytic Vegetation of Ladakh

The high altitude desert land of Ladakh with practically no rainfall over greater parts of the year is largely dominated by xerophytic vegetation. The natural tree elements being largely lacking except for more humid region of Nubra and other side valleys of the Indus river. Hippophae scrub is the major woody component which is used as fuel and material of roofing of houses.

Taking the state as a whole the species-wise composition of forests has been given in Table 3.3.

Table 3.3.

J & K State - Species of Forests - 1983-84

Forest species	Area in sq. kms.	Percentage
1. Coniferous		
(a) *Deodar*	1116.30	5.34
(b) *Chir*	1753.00	8.39
(c) *Kail*	1795.00	8.59
(d) Fir	3106.76	14.87
(e) Others	11404.32	54.59
2. Non-coniferous	997.70	4.78
3. *Rakhs* and game reserves	718.15	3.44
Total	20891.89	100.00

Source : Forest Statistics Division, J & K

Table 3.3 reveals that nearly 92 per cent of the total forest area is under conifers. The most valuable conifer i. e. *deodar*, however, occupies only 5.34 per cent of the forest area of the State. Moreover, with the increasing pressure of population the good quality conifers are being depleted at a faster rate. If remedial steps are not taken to check the over exploitation of forests the entire 'green gold' of the State may vanish by the middle of the next century.

In the flat valley of Kashmir, *Chinar*, poplar, (Salix spp. and poupulus spp.) and willow are the dominant species of vegetation. During autumn i. e. September, Mid-November, when temperatures are low and soil moisture level increases due to occurrence of dew and frost, these trees drop their leaves. The leaves of *Chinar* are converted into charcoal which is used as fuel in *Kangris* during winters. Many perennial grasses initiate new growth and several annual germinate most of which being suceptible to winter frost die down with only a few managing to survive in dormant conditions.

From the accounts given above, it is evident that the State of Jammu and Kashmir is relatively poor in vegetation in comparison to other Himalayan areas of the country. The human over-interaction in the form of development of agricultural land and pastures has accentuated the rate of depletion of forests. Whatever, is left of the former vegetal cover, vis-a-vis and kinds of stressess and strains, in the State still has a great importance in regard to soil conservation, besides providing timber, fuelwood, fodder, medicinal herbs and water conservation. The conservation of natural vegetation has to be given top priority and it becomes imperative for people and planners to preserve whatever is left. To achieve this objective a sound pragmatic strategy needs to be evolved in consultation with the researchers, planners and rural masses. Some of the steps which can help in reducing the rate of depletion of forests may be summed up as under:

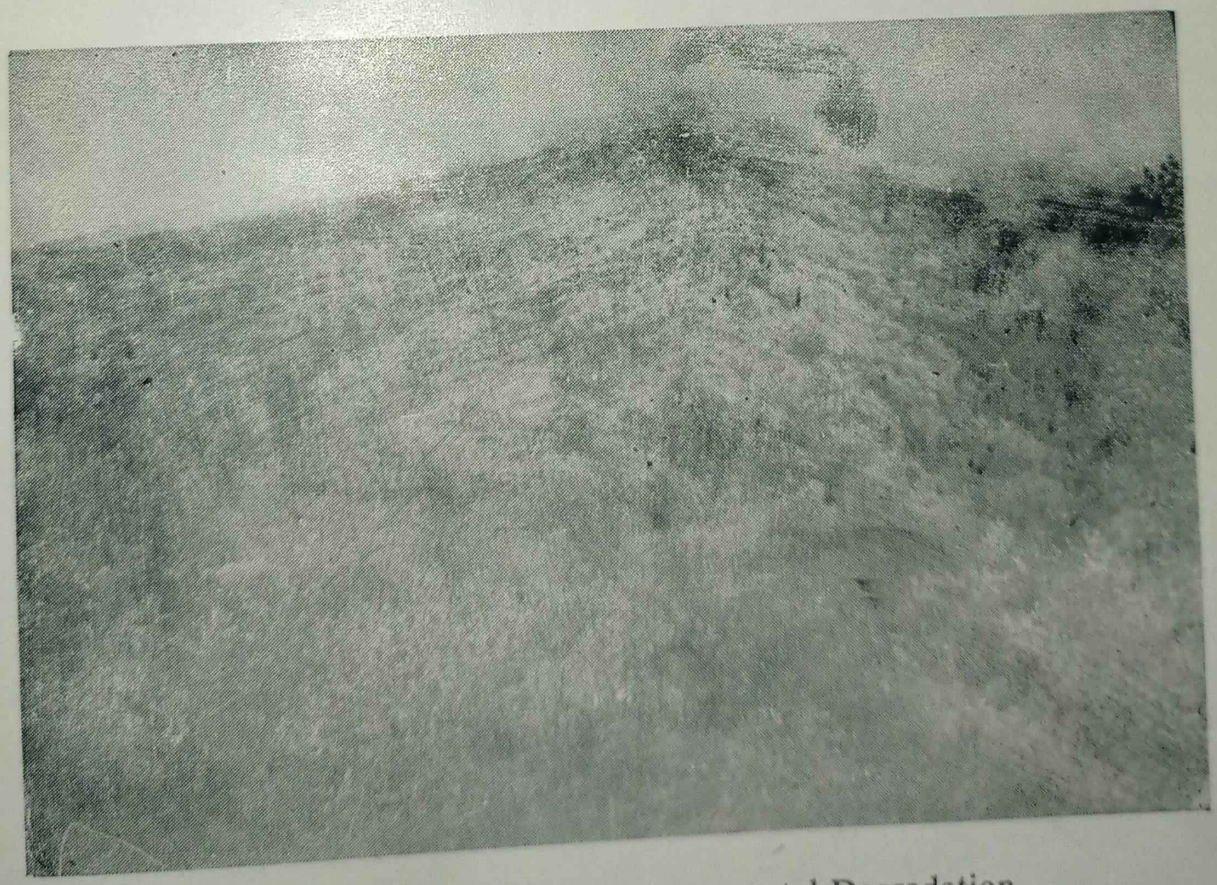
The government should implement the forest policy strictly and the wrong doers be brought to the book. In order to reduce the pressure on forests alternate sources of (hydel power, thermal power etc,) be adequately developed to provide electricity to the rural and urban population.

Another way of conserving forests is the prevention of waste in lumbering and in preparing the lumber for use. Still at many places much of the waste material is burned which can be used for fuel and some in making small articles like toys and handles for tools. More attention is to be paid to the treatment of lumber with chemicals to prevent its decay and destruction by insects.

Each year forest fires sweep over large areas. This great waste can almost wholly be prevented if adequate attention is paid to safe-guarding the forests from fire. In dry sesason hunters and idle visitors should be forbidden to enter the forest. The burning of forest waste should be done after a heavy rain or snowfall when the danger of conflagration is much less.

In brief a comprehensive forest development plan has to be adopted to increase the productivity of forests, to link up forest

9. Mixed Forests in the Valley of Kashmir.



10. Deforestation and Environmental Degradation.

development with forest based industries, and to develop forests as a support to economy.

Fauna :

As discussed in the preceeding chapters, the State of Jammu and Kasmir has great diversity in the physiograhy, climate and vegetation. This diversity in geo-ecological conditions provide the required habitats to varied animal kingdom. The fauna of the State, consequently differs from latitude to latitude and altitude to altitude. In general leopard, tiger, bear, wolf, foxes, deer, *Hangal*, wild-cats are the major wild beasts. Their population is however, decreasing owing to the over-interaction of man with nature and his encroachment in the forest and natural areas.

Mushk-deer (*Kasturi*), monkeys, *Langurs* white-bear, wild pig (*Bad*) have their habitats between 2,000 and 3,500 metres. They shift their place of stay seasonally i.e. in winters they descend at lower heights and in summers ascend to higher altitudes. The central Himalayas. Zanskar-range and higher reaches, of Pir-Panjals are the abodes of the animals.

Leopard, *Chetah*, wolves and foxes are found in the forests of Pir-Panjal, Liddar, Sindh, Doda, Udhampur, Riasi, Uri, Poonch, Karnah, Kupwara and Naranag catchment. Black-bear is very common in Lolab, Liddar, Doda, Rajouri and Uri tracts. *Barasingha* (Hangal) are also found in these localities.

Snow partridge, Himalayan-cock, *Chikor* (Kak), cuckoo, larks. *Bulbuls*, quil, storks, parrots, pegion. dove, ducks, *Teel*, vulture, crow, eagle and owls are the main birds of the State. A wide variety of reptiles, snakes fish and insects are also found in the State.

Soils :

The thin surface layer on the earth comprising of mineral particles formed by brack down of rocks, decayed organic material living organism and moisture is known as soil. It has a physical structure and chemical constituents. Soils may be classified into (i) Zonal, in broad latitudinal zones or belts; (ii) Inter-zonal, resulting from special parent rocks (e.g. limestone, sandstone); (iii) A zonal or immature soils, new material on which soil forming processes have not had sufficient time to work.

A soil map of Jammu and Kashmir State, based on scientific data has not been prepared so far. The cultivators recognise their soils by different nomenclatures, which differ from slope to slope and in many case from village to village. The land revenue records have classified soils on the basis of texture, structure and colour. Under the prevailing geo-ecological conditions a wide range of soils both of residual and alluvial origin are found in the state. As stated in the First Chapter, the major part of the State is hilly and mountainous. The outer plains of Jammu and the valley floor of Kashmir are however, covered with alluvial soils deposited by the running water and the fluvio-glacial action The hilly areas are covered by the residual soils, while the upper reaches of Chenab and Jhelum and their tributaries are coverd by the alluvial and morainic soils deposited by the running water and valley glaciers. On the

basis of rock strata and pedogenic characters the following major categories of soils may be identified in the State.

Hill Soils :

These soils are found in the entire mountainous tract of Jammu and Kashmir Divisions between 700 metres to 3,500 metres above sea level. The steep slopes affects run-off and drainage. Other things being equal, the run-off is large on steep slopes. As a rule more water run-off, lesser its absorption in the soil on steep slopes. The run-off also washes away more of the weathered rocks on steeper slopes. The depth of soil and soil-profile on steeper slopes is consequently, shallower than that on gentle slopes. Many soils in the mountainous areas are shallow, immature and highly susceptable to soil erosion. These soils are acidic in character, deficient in potash, phospheric and lime and therefore need manuring and fertilization for good yields. The humus content vary from slope and altitude to altitude. Depending on the availability of sunshine and rains these soils are devoted to the cultivations of maize, orchards (apple, peach, pears), pulses, fodder and oilseeds. The highr grounds are reserved as alpine pastures in which the Gujjar and Bakarwals rear their flock during the summer season. Scarcity of water, leeching, land-slides and avalanches are some of the major problems of the hilly soils which are being accentuated owing to the rapid removal of forest covers.

Alluvial Soils :

In a broad sense, all unconsolidated fragmental material laid down by a stream as a cone or fan, in its bed, on its flood plain, and in lakes, deltas and estuaries, comprising of silt, sand, gravel is known as alluvial soil. In other words sand, silt and mud brought down by rivers in floods and deposited on the temporarily submerged land are known as the alluvial soils. These are the most productive soils of state found in the southern plains of Jammu, the valley bottom of Kashmir, and in the shape of narrow strips and terraces along the tributaries of Chenab and Jhelum rivers. These soils may be classified into : (i) the old alluviums, and (ii) the new alluviums. The old-alluviums lie above the banks of rivers and are generally free from floods, while the new alluviums are frequently inundated as they lie in the flood plains of Jhelum, Chenab and their tributaries. The alluvial soils, wherever, irrigatated, grow two to three crops in a year. In the valley of Kashmir these soils are largely devoted to paddy cultivation while in the Jammu plains wheat, grain, rice, mustard, barley, sugarcane, potatoes and fooder are the crops grown in them. Being highly fertile, these soils are giving good crops of High Yielding Verieties of rice and wheat in areas of controlted irrigation.

Karewa Soils :

Karewas are fresh-water (fluviatile and lacustrine) deposits, found as low flat mounds or elevated plateaus in ihe valley of Kashmir and Kishtwar. The imortant *Karewas* are found in Kulgam, Shopiyan, Badgam, Qazigund, Tangmarg, Gulmarg, Baramulla, Laithpora, Chandhara, Pampore

Bijbehora, Awantipora, Islamabad, Mattan, Tral and Ganderbal.

Karewa soils are of great economic importance as they are generally devoted to saffron, almond, walnut, apples and peaches. The higher reaches of Karewa soils are under maize culivation. Wherever adequate irrigation facilities are developed, *Karewas* are also used for paddy cultivation.

In Ladakh the highly weathered rocks under the mechanical impact of insolation and frosting result into fine grained, light coloured soils which are deficient in humus contents. These soils are rich in potassium, nitrate and phosphate and give good agricultural returns in pockets where irrigation water is available. On the river terraces of Indus and its tributaries the soils are of alluvial nature which are being utilized for the cultivation of vegetables, *grim* small millets, fodder and orchards.

The farmers of Jammu and Kashmir also recognise soils with their local nomenclatures. For example, the Kashmiri farmers recognise the following major soil groups.

Gruti :

Gurti soils contain a large proportion of clay. Its water retainnig capacity is high and in the years of scanty rains, it is the safest for rice cultivation, Contrary to this, if rains are heavy, the *Gruti* soil gets compacted and achieves the shape of cakes. Under such scanty rainfall conditions the soil gives poor agricultural returns.

Behil :

Behil is a rich loam of great natural fertility. In this soil, the humus content is high, consequently, it does not need heavy manuring. In case of heavy manuring the soil becomes too strong which lead to luxurious growth of plants but poor formation of cereals. On the whole this soil is ideally suited for paddy cultivation.

Sekil :

Sekil is a light loam with sandy sub-soil. In *Sekil*-fields if artificial irrigation is available, good crops of rice are harvested. This soil is found on the lower edges of *Karewas* in the valley of Kashmir.

Dazanlad

This type of soil is generally found in the lowlying and swampy areas. There are however, isolated villages in which it is also found in higher locatations. A peculiar characteristic of *Dazanlad* is that the irrigation water when stands in the field turns red in colour. If controlled irrigation is provided, High Yielding Varieties of paddy can be grown in *Dazanlad* successfully.

Nambal (Peaty soils) :

Near the banks of Jhelum river and in the vicinity of the Wular and Anchar lakes is found the rich peaty soil *(Nambal)*, In the years of normal rains and moderate snowfall *Nambal* soil gives good yields of rape-seeds, mustard, maize and fodder.

Karewa Soils :

The *Karewa* soil is generally *Gruti*. The most productive *Karewa* land has blackish soil known as *Surhzamin*. The red *Gruti* is the next best while the yellow buff soil is known as the worst of all. It is found in the *Karewas* of Pampore, Kulgam, Qazigund, Badgam, Tral, Baramulla, Mattan and Ganderbal.

Tand :

Land on the slopes of mountains, reclaimed from the forests is called *Tand* soil. After reclamation under the impact of leaching and soil erosion such lands loose their productivity within six to ten years.

Zabelzamin :

Patches of irrigated land if excessively irrigated lose their fertile character and develop alkaline formations. Such adversely affected lands are known as *Zabelzamin.*

There are numerous other types of soils also recognized by the farmers which include *Kharzamin, Tresh, Limb, Ront, Shath* and *Tats.*

Soil Conservation :

Soils in the State of Jammu and Kashmir, especially in its hilly arcas are adversely affected by soil erosion. The removal of organic matter and plant nutrients from the top layer and its leaching by the agents of denudation is called soil erosion. Unchecked erosion gradually leads to poverty of soil and undermines the strenght of nations. There are a number of physical and socio-cultural factors responsible for the depletion and erosion of soil. Slopes, precipitation, weather, temperature, wind, snowfall and human action (over grazing, nonjudicious cropping) all combine to accentuate the rate of soil erosion. To overcome the problem of soil depletion, some of the important devices to be adopted are given below :

The soil erosion can be checked by maintenance of an affective vegetation cover, contour ploughing, rotation of crops, terracing, composting, planting of cover crops, creation of wind breaks (trees, fences), pipe-drainage to prevent gullying, damming of gullies or filling them with brushwood.

REFERENCES :

1. D.H. Davis, 1948, *The Earth and Man,* New York.
2. G. Morgon, et. al., 1973, *Human and Economic Geography*, London.
3. L. Symons, 1969. *Agricultural Geography*, London.
4. Plyurnin, *Reclamative Soil Science,* New York.
5. M. Husain, 1977, *Human and Economic Geography*, New Delhi.
6. —— 1979, *Agricultural Geography*, New Delhi.
7. P. Kachroo, 1985, "*A Note on Flora of Kashmir, Geography of Jammu and Kashmir*, edt. M. Husain, New Delhi.
8. V. Koul, 1985, "Changing Vegetation of Kashmir" *Geography of Jammu and Kashmir*, edt. M. Husain, New Delhi.

CHAPTER — IV

Mineral Resources

The economic prosperity and social well-being of a country largely depends on its mineral, power and human resources. The mineral resources are highly unequally distributed and they are exhaustible. However, large the deposit of a given mineral, continuous mining will exhaust the ores. Men may apply the latest techniques in order to extract every bit of valuable ore, or they may continually prospect new areas to find hitherto unexploited mineral, but they can never increase or replace the minerals, that are mined. Minerals are thus finite and exhaustible.

The State of Jammu and Kashmir is well endowed with forest and water resources. It is however, deficient in coal, petroleum, natural gas and basic minerals (iron ore). Some of the important minerals found in the State are copper, lead, zinc, bauxite, chromium, gold, arsenic, biospore kaolinite, magnesite, borax, gypsum, bentonite, limestone, sulpher, ochre, coal, lignite, slate, marble, sapphire, rubellite. quartz and serpentine.

Coal :

Coal is a combustible rock which had its origin in the accumulation and partial decomposition of vegetation. Coals differ in the kinds, and manners of preservation of plant material (type). They vary in the degree of carbon concentration and in the amount of inorganic impurities. The chief ranks of coal are anthracite, bituminous, lignite and peat.

The State of Jammu and Kashmir is not well endowed so far as fossil fuel is concerned. Field surveys and prospectings conducted by the Geological Survey of India recently, reveal that lignite, anthracite and peat deposits are found in small quantities. In general, the coal deposits of the State are of the Eocene Age, found in association with Nummulitic-limestone (Murree Series), which have low carbon contents, ranging between 50 to 60 per cent.

The major coal deposits of the State are found at Kalakote, Jangligali, Metka, Ladda, Chinka, Dhansal, Swalkote, Chakar, Dandil, Mohogala and Kura. Coal has also been reported from the Baramulla, Handwara and Pulwama districts. Lignite is found at Shaliganga, Chowkibal and Nichahama.

It has been estimated that Kalakote coal

mines have a workable reserve of about 5.4 million tonnes upto a depth of about 300 metres. Analysis of Kalakote coal reveals that it is of low volatile anthracite grade with ash content varying from 10 to 20 per cent and fixed carbon about 50 to 60 per cent. In Ladda and Jangligali coal fields reserves are estimated to be about five million tonnes. The coal of Ladda also has about 50 per cent carbon and 20 per cent of impurities and moisture.

The Geological Survey of India has carried out explorations at Mohogala and Metka (Poonch District) and arrived at the result that these places, upto a depth of 300 metres have about 9 million tonnes of coal. The fixed carbon in the coal of these deposite is about 57 per cent, volatile 35 per cent and ash and moisture 10 and 3 per cent respectively.

At persent coal is being mined near Kalakote to feed the only Thermal Power Plant of the State i.e. Kalakote. The rated capacity of the plant is 7.5 MW and 35,000 tonnes of coal is being mined annualy in its vicinity. The energy generation capacity of the plant may be enhanced substantially if new generators are installed in the Kalakote Plant and new technology deplcyed for the mining of coal.

Lignite deposits are found mainly in the Valley of Kashmir which occur in the *Karewa* formations, right from Nichahom upto Lanlayab. The lignite seams are, however, associated with clays and loams and are interbedded in Carboneceous clays in various localities of Kashmir Division. The major lignite deposite are in the vicinity of Nichahom, Chowkibal, Budhasheng, Lanylab, Shaliganga, Raithan and Tangmarg.

According to the Geological Survey of India, Nichahom lignite seams occur from north to south, running over a distance of about 85 kms. and estimated reserve of lignite in this mine is about 85 kms. and covering a width of 16 kms. upto a depth of 8 metres. The estimated reserve of lignite in this mine is about 6 million tonnes. In between Nichahom and Chowkibal a reserve of 8 million tonnes has been estimated.

The total estimated reserve of lignite deposits in the State, according to the Directorate of Geology and Mining is about 85 million tonnes, but owing to thin seams and high ash contents, it is mined only at Nichahom. In fact, the lignite of Kashmir Valley contains only 8-25 per cent carbon, 3o per cent ash, 15 per cent mositure and 27 per cent volatile matter.

Peat—a superficial accumulation consisting of vegetation matter which has become decomposed to a certain limited extent in the cold regions is also found in the Valley of Kashmir. Its deposits are found in the swampy grounds in the higher valleys. Peat is cut and dried before being used as fuel. It is also applied in field as a manure.

Natural Gas

Natural gas has not been struck so far in any part of the State. In Jammu Division, areas like Ramnagar, Dharmthal, Nawashara and Rojouri are under investigation for natural gas. Occurrence of dry gas has been reported by the Oil and Natural Gas Commission (ONGC) in the Kashmir Division. The ONGC has proved the existence of 'Dry Gas' at the Silk Factory Road, Rambagh (Srinagar). Various indications such as sulphurous water, hot

springs, gas seepage etc. have been noticed in several areas of Jammu and Kashmir which prove that in near future oil and natural gas may be found in the State.

Metallic Minerals

There are a few minerals found in the State. Though at present the State is not producing any significant metallic mineral, there are evidences which prove that gold and copper have been mined in the Ladakh and Kashmir Divisions respectively. The occurrence of metallic mineral in the State is in isolated tracts and in many cases their exploitation uneconomic. A brief description of some of the metallic minerals found in the State is given in the following paras.

Gold

Gold is one of the rare and precious minerals, It is found in hydrothermal veins in the crust or in alluvial grains, placer deposits and conglomerates.

Gold bearing quartz veins have been found in areas of Dras, Suru and Indus Valley in the Kargil and Leh Districts. The gold found in quartz veins gets exposed under the impact of weathering and may be transported by running water. In fact, particles of gold have been noted as placer deposits in the courses of rivers and streams of Ladakh and the terraces of Indus river. Gold has been traced in conglemorate deposits in the valleys of Dras, Suru and Indus, forming a continuous deposit, ranging in thickness from one metre to four metres. It is estimated that 0.6 gram of gold can be obtained per cubic metre of conglemorate in Ladakh.

Copper

Copper is extracted from the ore of chalcopyrite which is found in rocks like serpentine, diorite, chloriticschist and slates Chalcopyrite a double sulphide of copper and iron is the main copper ore found at Sumbhar (Anantnag), Lashtial (Baramulla) and Ganderbal. In Ladakh region native type of copper has been reported from areas of Zanskar. Investigations about the occurrence of copper in Doda District have also been started. It is hoped that copper ore in all the quartz veins of quartzite rocks of the Doda district have appreciable quantities of copper which may be exteracted economically.

Lead

Lead does not occur in nature as the native metal, yet it has been known to man since the earliest times because of its easy extraction from ore. It is a mineral of great economic importance as it is used largely in various industries.

The main ore of lead is galena. It is found in hydrothermal veins. Galena is a grey coloured mineral. It has shining metallic lustre, relatively soft and very heavy, often crystilising in nearly perfect cubes. Galena and other ores of lead are found in association with slate, phyllites, graphiticschist and limestone near Ramsu (Jammu Division). About one million tonnes of galena has been estimated in the Ramsu region.

In the Division of Kashmir, galena deposits have been reported in Buniyar (Baramulla). The ore of Buniyar deposits may yied 30 to 70 per cent of lead. Several parts of side valleys of Kashmir are being

investigated and there is a strong possibility of lead deposits in the Panjal Trap formations.

Bauxite

Bauxite is a residual deposit formed under special climatic conditions. It is a mixture of hydrated aluminium oxides, but the name is applied particularly to varieties of the rock laterite rich in hydroxides of aluminium which are the chief ores of the mineral.

Bauxite is a mineral of great economic importance. Being light and resistent, it is used mainly in air-craft industry. In the State of Jammu and Kashmir extensive deposits of bauxite are found in Chhakar (Riasi). near Sangarmarg, Salal, Panhasa, Sukhwal-gali and Khander in the districts of Rajouri and Udhampur. The Geological Survey of India has estimated about 12 million tonnes of bauxite in these fields and the analysis has revealed that the ore contains 60 to 70 per cent of alumina.

Chromium

The main ore for chromium is the chromite which is found in ultra basic igneous rocks and serpentine. The chromite ore occurs usually as brown or black crystal. In the State, chromite deposits are found in Dras, Bumbat, Tashgam, and Kargil. It is mainly used in metallurgy.

Zinc

Zinc is obtained from the zinc sulphide and zinc blende. The mineral is found usually in limestone and veins associated with copper ores and lead ores. Zinc is found in Buniyar area in association with galena, chalcopyrite and pyrites. Zinc ore is also found in limestones deposite of Udhampur.

Sapphire

Sapphire is a blue transparent or translucent correndum (gem). It is naturally occurring oxide of aluminium and contains as much as 52 per cent of aluminium. In India, Jammu and Kashmir is the only State in which sapphire deposits of good quality are found. The famous sapphire mines of Poddor near Sumjam in Kishtwar are located at an elevation of 4,418 metres in the upper reaches of Chenab river in the Doda Districi. In Kishtwar sapphire was discovered in 1881 and since then mining has been going on intermettently. The pricious stone is interbedded in the rocks of Salkhala series and is associated with meta-basic, intruded by a number of pegmatite and quartz veins. The sapphire bearing portions are lenticulars composed of plagioclase, felspars, tourmaline and corundum. The precious stones occur as small prism of 5 mm width and shows pyromidal structure.

Ruby

Ruby is a red transparent variety of corundum (gem). It is found in the areas of Zanskar, Sumjam and Poddar in association with sapphir bearing rocks. Ruby occurs in metasediments and meta-basic intruded rocks such as quartz and pragmatites.

There are numerous other non-metallic minerals found in the State, most of which are bedded deposits.

Bentonite

Bentonite is a especial assemblage of clay minerals, in many instances formed by weathering of acid, lavas and pyroclastic rocks. The deposits of bentonite are spread between Bhimber and Kathua in the Jammu Division. These deposits lie, on the gentle dipping slopes of the outer plains of Jammu. Para, Chittopali, Modkali, Uttar Bhimber-Bazar and Panipur are the areas of Jammu Division in which bentonite is found. From Bhimber to Kathua there is a continuous bed of bentonite deposit running for a length of about 10 kms. and about half a metre thick occupying a definite horizon in Upper Siwaliks.

Bentonite is used for cleaning grease spots, soap making, ceremics plaster, and filling paper, washing silk and cotton clothes, It is also known as 'Serati-Mitti'.

Kaolinite (Clay Minerals)

Kaolinite is a clay produced by the decomposition in-situ of the felspar. It is the natural (unwashed) China-clay. Kaolinite is found in association with bauxite deposits of Jammu. It occurs between Great-limestone and breccia and Nummilitics and coal measures of bauxite-series of the Salal, Sonmarg and Chakar areas. The local name of the mineral is *Mokal*. It is used for white-washing purposes. Kaolinite deposits are available upto a thickness of one to four metres in the areas of its occurrence which can be used effectively in pottery making.

Borax

Borax is deposited as a result of evaporation of hot spring water. Ladakh is the only part of the country in which borax is found. In the form of surface deposits, borax is found in the Puga Valley and Chumathang of the Maheyang area of Ladakh. Annually about 15 tonnes of borax is obtained from these places.

Gypsum

Gypsum is an evaporite mineral found in clays and limestones; sometimes associated with sulpher. It is an important non-metallic mineral of great economic importance. It is a hydrous sulphate of calcium. Snow-white gypsum with intercalation of quartzite and schists is found in areas of Uri, Ramban, Assar, Batote. The Uri tract has gypsum deposits of about 30 million tonnes. Gypsum mined near Uri is supplied to the Wuyan Cement Factory. Ramban and Assar fields have gypsum deposits of about 19 and 5 million tonnes respectively.

Magnesite

Magnesite is a mineral of the carbonate group. It is found in irregular veins in serpentine and formed by replacement of dolomite and limestone. In the State Magnesite is found in Shergol (Leh-Kargil Road). The Geological Survey of India is hopeful about its deposits in the Katra area of Jammu Division.

Sulpher

Sulpher is a mineral obtained from iron pyrite or in the neighbourhood of volcanic regions. It is also associated with limestones, sandstones and salt domes. In the State of Jammu and Kashmir sulpher is found in areas of recent volcanic activity,

around hot springs. Substantial deposits of sulphur have been located in the Puga Valley of Ladakh Division. The Geological Survey af India has estimated a reserve of about 6,000 tonnes of sulphur in Puga Valley.

Lemestone

Limestone is a carbonate of calcium. It is found in Manasbal, Beru, Achabal, Barwar, Verinag, Wuyan, Jangli-gali, Salal, Riasi, Basohli, Kalakote and Khalsi (Ladakh).

Slates and Phyllitics

Slates and phyllites are the metamorphic rocks of great economic importance. Slate is obtained from the vicinity of Banihal, Ramban, Ramsu. It is being used successfully for roofing.

In Marpathri near Gulmarg about ten million tonnes of good quality of roofing slate has been estimated by the Geological Survey of India.

Sand and Bajri

Enormous quantities of sand, pebbles and shingles are avai'able in the Chenab and Tawi rivers and the numerous *Nallas* and hilly-torrants of the State. Sandstones are in abundance along the Jammu Srinagar National Highway and the Jammu Poonch Road in the the Siwaliks and Murree tracts which are being used for building materials.

Mineral resources as discussed are exhaustible and therefore should be used judiciously. The exploitation and conservation of mineral resources largely depends on the technological stage, the location of mineral ore with reference to transport and market. The exhaustible mineral resources deserve special attention. A scientific policy about their exploitation and utilization needs to be formulated.

REFERENCES :

1. W. R. Lawrence, 1967 '*The Valley of Kashmir*'.
2. D. G. A., Whitten, et. al., 1972 '*A Dictionary of Geology*, London'.
3. *Bulletin*, Deptt. of Geology & Mining, J & K.
4. *Digest of Statistics*, J & K. 1984.

PART II

SOCIAL PERSONALITY

CHAPTER—V

Major Ethnic Groups

The history of peopling of Jammu and Kashmir State is a record of constant impulses of immigration from the north-west, west, south and east directions. The alien races, ethnic groups and various religions have influenced the cultural ethos and mode of life of people of this region. In the present chapter an attempt has been made to give a brief account of the major ethnic groups of the State.

Ethnic group, in the opinion of Jordon is a group of people possessing a common ancestry and cultural tradition with a long feeling of belonging and cohesiveness, living as a minority in a larger society. Each social group is the keeper of distinctive cultural traditions and the nucleus of various kinds of social interactions. An ethnic group provides not only group identity, but also friendship marriage patterns, business success, and the political power base.

The mosaic of ethnic group in Jammu and Kashmir State is complex and the race structure cannot be explained without understanding the pre-historic movements of people. In the process of peopling of the region, the Dards in the north-west, the Ladakhis in the east, the Gujjars and Rajputs in the south and Paharis in the south-east have closely influenced the existing ethnicity of the people. The racial composition of the State was also influenced by the immigrants from the territories of Turkmenia, Tadzkistan, Uzbaikistan, Kazakistan, Georgia, Azerbaijan (U.S.S.R.) Turkey, Iraq, Iran and Afghanistan.

The various ethnic groups of the Jammu and Kashmir State though intermingled have their areas of high concentration. For example, Kashmiris are mainly concentrated in the Valley bottom; Dards occupy the valley of Gurez; Hanjis are confined to water bodies of Kashmir; Gujjars and Bakarwals are living and oscillating in the *Kandi* areas; Dogras ocoupy the outskirts of the Punjab plain, while Chibhalis and Paharis live between Chenab and Jhelum rivers. Moreover, there are numerous small ethnic groups like Bhotas, Gaddis and Sikhs which have significant concentration in isolated pockets of the State.

Kashmiris

Kashmiris are well spread in various parts of the State but their major concen-

tration lies in the Valley of Kashmir, Kishtwar, Bhadarwah, Doda and Ramban tehsils of the Jammu Division.

'Kashmiri' is a wide term which has loosely been applied for several streams of immigrated mainly from Turkey, Iran, Central Asia and Afghanistan, and settled in the Valley. There is a close bearing of the Indo-Aryans on the racials composition of Kashmiris. In fact, the Indo-Aryan religions and languages have substantially affected the mode if life of the Kashmiris. The influence of Sanskrit on Kashmiri language is strong and cogent to this day. Moreover, Kashmir has also received racial impulses from Indo-Greeks which have influenced the race structure of the people considerably. The influence of Dards, Ladakhis and Punjabis has also moulded the ethos of Kashmiri culture.

Kashmiris are broad shouldered and usually of medium to tall stature. They are much dolichocephic, have a well developed forehead, a long narrow face, regular features and a prominent straight and finely cut nose. They wear short *pyjamas*, a long loose large sleeved gown locally known as *Pharan*, and a skull cap. In intellect they are superior to their neighbours and efficient in business. In disposition they are talkative. cheerful and humerous.

Most of the Kashmiris live in villages and are dependent on agriculture. Paddy, orchards, saffron are the main crops grown by them while the urban Kashmiris are engaged in business, tourism, hotel-management, carpet making, silk industry, shawl-making, wood work, pieper-mashi and several other handicrafts,

Dards

Dards have a long history. Ptolemy in his book 'Almagast has used the word Daradrai for Dards of the western Himalayas. Before embracing Islam, they were the followers of Budhism and Hinduism. At present their major concentration lies in Dardistan (Derdesa), the area to the north of Kashmir Valley, especially in the catchment of Kishanganga north of Sardi, Gurez and Tilel.

In the opinion of Leitner, Dards belong to Aryan stock. This opinion is also endorsed by Ray who states that the Dardic Aryans parted from the main Aryan mass just after their enterence into India. Dardic Aryans then colonised the Pamir region from where they spread to Chitral and Gilgit.

In physical appearance the Dards are broad shouldered, moderately stout-built and have well proportionate bodies. In face they are not handsome, their hairs are usually black but sometime brown, in complexion they are moderately fair. Their eyes are either black or hazel. They are known for their ferocity. In the social hierarchy they are divisible into: (i) Renue (ruling class), (ii) Shins (religious sect), (iii) Yashkun (cultivators) and (iv) Dum (menial class). Dards are dependent on agriculture, pastoralism, cottage industries and trade.

Ladakhis

Ladakhis have been named as the people of snow-living in an arid plateau, surrounded by mountains, where cultivation of crops is hampered by severe cold and non-availability of water for irrigation. Ladakhis are a mixture of Mongo loid and

Aryan races. The Aryans who settled originally in the sub-continent's northern parts were the early Budhist people from Kashmir and the Dards from Gilgit. The Mongolian stock is traced to Tibet, from where the shephereds and nomads came to the valleys of Ladakh to graze their flocks. The present day population of Ladakh is the result of blending together of Dards and the Mongolians.

The recent papulation data reveals that Ladakh is inhabited by the Budhists, the Muslims, the Hindus and the Christians. The Budhists are mostly the decendents of the Mongolians and bear a close affinity in features with the Tibetans. They are reputed for religious tolerance, honesty and hard work, There are some families even now, members of which follow different religions and yet live in peace. Where the husband wife profess different faiths, the male child is regarded as a member of the community to which the father belongs while the female child is admitted to the religion of her mother.

Budhism does not recognise any caste or racial distinction, but some differentiation is made on the basis of social and occupational considerations. In any case the Budhists may be classified among three principal categories, namely, *Rigzang*, *Mangriks*, and *Rignu*. *Rigzang* is the upper class. *Mangriks* who constitute the middle class consist of *Lamas*, *Unpos*, *Nangsu*, *Lorjo*, and *Thakshos*. The lowest class which is known as *Pignu* includes *Beda*. *Mou*, *Garra*, *Shinkhan* and *Lamkhun* etc.

Ladakhis are truthful, good natured, cheerful, friendly, industrious and honest. They are seldom angry and soon ready to become friends. In conversation they are very polite. Ladakhis are well built and have developed sufficient resistence to work even when the temperature is as low as —25°C (Chapter 2).

The population of Ladakhis is not increasing steadily, probably owing to the prevalence of polyandry and partly on account of climatic and economic conditions which have been operating against the development of population and its increase in number (Chapter 6, Tables 6. 1, 6. 2).

Dogras

On the outskirt of the Siwaliks facing the plain of Punjab is the habitat of Dogras a distinctive ethnic group of Jammu Division. There is controversy among the social anthropologists about their origin. The major concentration of Dogras however, occurs between the two holy lakes i. e. Saroinsar and Mansar. Lake Saroinsar is at a distance of 38 kms. to the east and Mansar 64 kms to the west of Jammu city.

In the opinion of some social anthropologists 'Dogra' is a corruption of the Rajasthani word '*Dungra*' means 'hill' and when the people of Rajasthan migrated in the hilly tracts under drought conditions, the Rajputs gave this name to the people of hilly country, Sten opines that the name '*Durgara*' is probably a tribal designation like '*Gurjara*' - original of the modern Gujjar, and similarly the word '*Durgara*' has been derived from *Durgara*' through Prakrit Dogra.

Whatsoever the controversy about the origin of the word Dogra may be they belong to the Aryan race and speak the

Dogri language. Most of them have Brahmini path and have the sects of *Varnashram*. A substantial section of the Dogras embraced Islam during the 16th and 17th centuries, At the time of partition of the Sub-continent most of the Muslim Dogras migrated to Pakistan.

In appearance Dogras are short statured, slim and have high shoulders. Their complexion is wheatish, silghtly hooked nose, brown eyes and jet-black hairs. The lower castes of Dogras in general have blackish complexion.

Hanjis

Hanjis - the dwellers of water, constitute a significant ethnic group in the valley of Kashmir. They are mainly confined to the Dal, Wular, Anchar lakes and the Jhelum river, especially between Khanabal (Ananatnag District) and Chattabal (Srinagar District).

There is not unanimity of opinion amongst the scholars about their arrival in the valley of Kashmir. They, however agree in saying that 'Hanjis' belong to one of the ancient racial groups who were essentially *Nishads* (boatmen). Some of the Hanjis claim themselves as the descendents of Prophet Noah. There are historical evidences showing that Raja Pratap Sen introduced boatmen from Sangaldip (Sri Lanka). It is believed that before their conversion to Islam, they were *Kashtriyas*.

Hanjis are sturdy, hard working active people with great imagination. On the basis of occupation and social status Hanjis are divisible into : (i) *Demb* - Hanz (vegetable growers), (ii) *Gari*-Hanz (water-nuts gatherers), (iii) *Gad*-Hanz (fishermen), (iv) *Mata*-Hanz (who deal in wood), (v) *Dunga*-Hanz (owners of passenger boats), (vi) *Haka*-Hanz (collectors of wood from water bodies), (vii) *Bahatchi*-Hanz (who live in Bahatch boats), (viii) *Shikara*-Hanz (who ply *Shikara* boats), and (ix) Houseboat Hanz. The various Hanji groups use boats of different types, shapes and sizes, e. g. *Bahatch, Khoch, Demba-Nav, Kara Nav, War, Tchakawar, Parinda* and Houseboat. The type of boat which a Hanji owns and uses for earning his livelihood or the product he deals with to a great extent, denotes his class and social status.

The sex-ratio of Hanjis is about 892 as against 936 the national level and 899 the state average. The low sex ratio shows that the males are better cared and well fed than females. In fact, the females are still a neglected lot and are not properly cared like the underdeveloped patriarchal societies.

A field study conducted reveals that the literacy rate in Hanji's is only 12 per cent. The proportion of literate males and females being 20.5 and 3.7 per cent respectively. Nearly 34 per cent of the total population of Hanjis is engaged in various type of productive activities, while the remaining 66 per cent is dependent population, belonging to juvenile, Senile and household female population.

Hanjis in general do not have fixed incomes. Their income varies from month to month and season to season. It is more true of those who are engaged in hotal management and houseboat industry. In fact, tourism is an important activity on which many of the Hanjis are dependent. Tourism in itself depends on many other factors

like the number and pattern of toursit inflow, the weather conditions and the political situation of the State.

Hanjis, a peculiar ethnic group attached to water in general is not developing at the desired rate. The living conditions of *Gad*-Hanjs and *Demb*-Hanjs are poor and unhygienic, while those who are houseboat owners have better income and social status. Some pragmatic planning is to be made for the socioeconomic upheaval of the Hanjis of the State.

Gujjars and Bakarwals

Gujjars and Bakarwals constitute a significant proportion of the population of the State. In general, they have nomadic character and largely depend on flocks and cattle keeping for thier livelihood.

The early history of Gujjars and Bakarwals is obscure. There are several theories about their origin. According to one school of thought, before their arrival in the sub-continent they were the inhabitants of Georgia (*Gurjia*) a territory situated between the Black Sea and the Caspian Sea in the Soviet Union (Fig. 10). Under certain

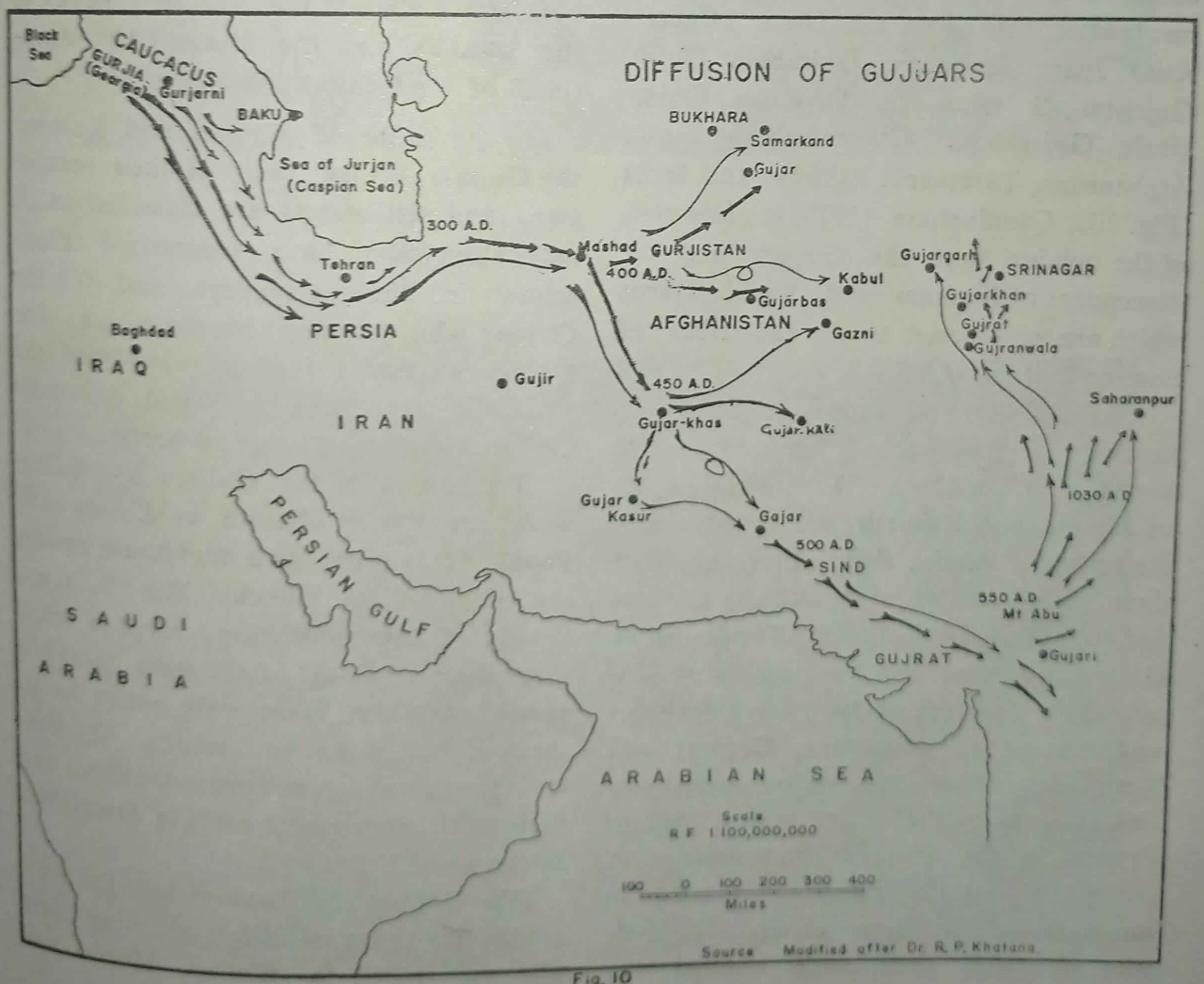


Fig. 10

push and pull factors they left their abode and through central Asia, Iraq, Iran and Afghanistan crossed the Khyber Pass to enter the Subcontinent of India (Fig. 10). In the Sub-continent making a southward march through Bilauchistan they reached Gujrat. Most probably in the 5th and 6th century A.D. at the occurrence of some serious droughts they moved out of Gujarat and crossing Rajasthan and Punjab entered the green pastures of the Siwaliks and the Himalayas. Having their place of origin as Georgia and moving towards the Sub-continent of India they named several settlements after their name, e.g. Gujar (Central Asia) Juzrs (Gurjara), Gujrabad, Gujru, Gujristan, Gujrabas, Gujdar-Kotta, Gujar-Garh, Gujarkhan, Gujranwala in Iran, Afghanistan, Turkmenia Pakistan and India (Fig. 10). Cunningham (1970) is however, of the opinion that the Gujjars are the descendent of Kusham and Yachi Tribes which are considered to be the tribes of Eastern Tartars (U.S.S.R.).

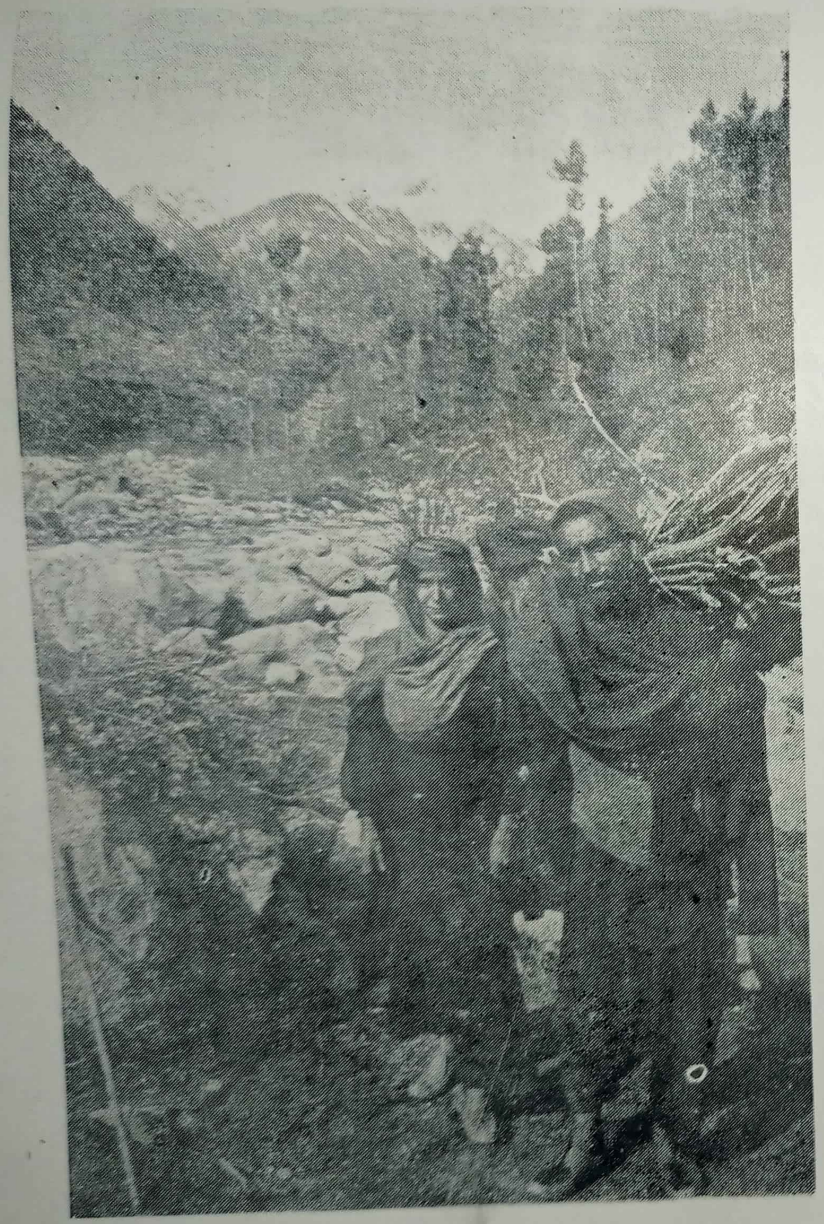
The diffusion and spread of Gujjars in the State of Jammu and Kashmir is not known with certainty. When the Gujjars of Jammu and Kashmir are asked about their place of origin, they simply say that their forefathers had migrated from Gujarat and Rajputana (Rajasthan). The arrival of Gujjars in Jammu and Kashmir is attributed to the outbreak of devastating droughts and famines in Rajasthan, Gujarat and Kathiawad. There are archaeological evidences to prove that there was a spell of dryness in the 6th and 7th centuries in Rajasthan and Gujarat which led to the outmigration of these people (Gujjars), who alongwith their cattle entered the pastures of the Siwaliks and the Sub-Himalayas. The 'Gujri' language is now recognised to be a form of Rajasthani language, which supports the hypothesis that Gujjars have outmigrated from Rajputana (Rajasthan).

The major concentration of Gujjars lies in Jammu, Rajouri, Udhampur, Poonch, Uri, Ganderbal, Anantnag, Daksum, Narang and the *Kandi* areas of the Jammu and Kashmir Divisions. Although some of them have started developing land connections, they are essentially cattle-rearers and a section of them—Bakarwals regularly oscillates between the southern slopes of the Siwaliks and the *Margs* (Alpinc-pastures) of the Central Himalayas.

In the State of Jammu and Kashmir the Gujjars, on the basis of their occupations and settlements are classified as (i) cultivators who have sedentrized themselves in the sidevalleys, and (ii) the Gujjars who practice transhumance. The second category is further sub-divided into *Dodhi*-Gujjars (milk-man) and Bakarwals Gujjars (who rear sheep and goats).

The houses of the Gujjars and Bakarwals are locally known as *Kothas* and *Bandis*. It is generally a mud-house against the slope of a hillock. The walls are devoid of any ventilation except a small entry door. In one of the walls there is a small hole which is the only outlet for all types of bad gasses and smoke. The shelter though unhygienic protects them and their cattle from severe colds of December, January and February.

The Gujjars and Bakarwals in the State are the followers of Islam, excepting a few who are settled in Bimber, Mirpur and



11. Preparation for Severe Winters—A Bakarwal Couple in Naranag Valley

12. Gujjars of Kashmir.

13. Transhumance in J & K.

14 Gujjar Labour at Lunch—Wangat Valley, Kashmir.

Rajouri. The Gujjars, because of their strict religious adherence, have emerged as the most outstanding tribe who are trusted for their honesty.

So far as the dress is concerned, the males wear a long shirt and a trouser as per the tenets of Islam. Besides, they wear a turban of a peculiar style. The ladies usually wear a long shirt and *Shalwar* with a cap or *Dupatta* on their head. Though *Purdah* system among ladies is not observed, they avoid to face the strangers.

Gujjars are known for their hard work and gentle nature. Rearing of cattle horses, goats and sheep is their main occupation. They have simple food habits. Maize, milk and milk products are the main ingredients of their diet, They usually start their day with a glass of milk and *Chapatis* (bread) of maize. The same food is being repeated at lunch and dinner. They do not use any type of toxic drinks as taking liquir is prohibited in Islam. Even tea is not consumed by all the Gujjars.

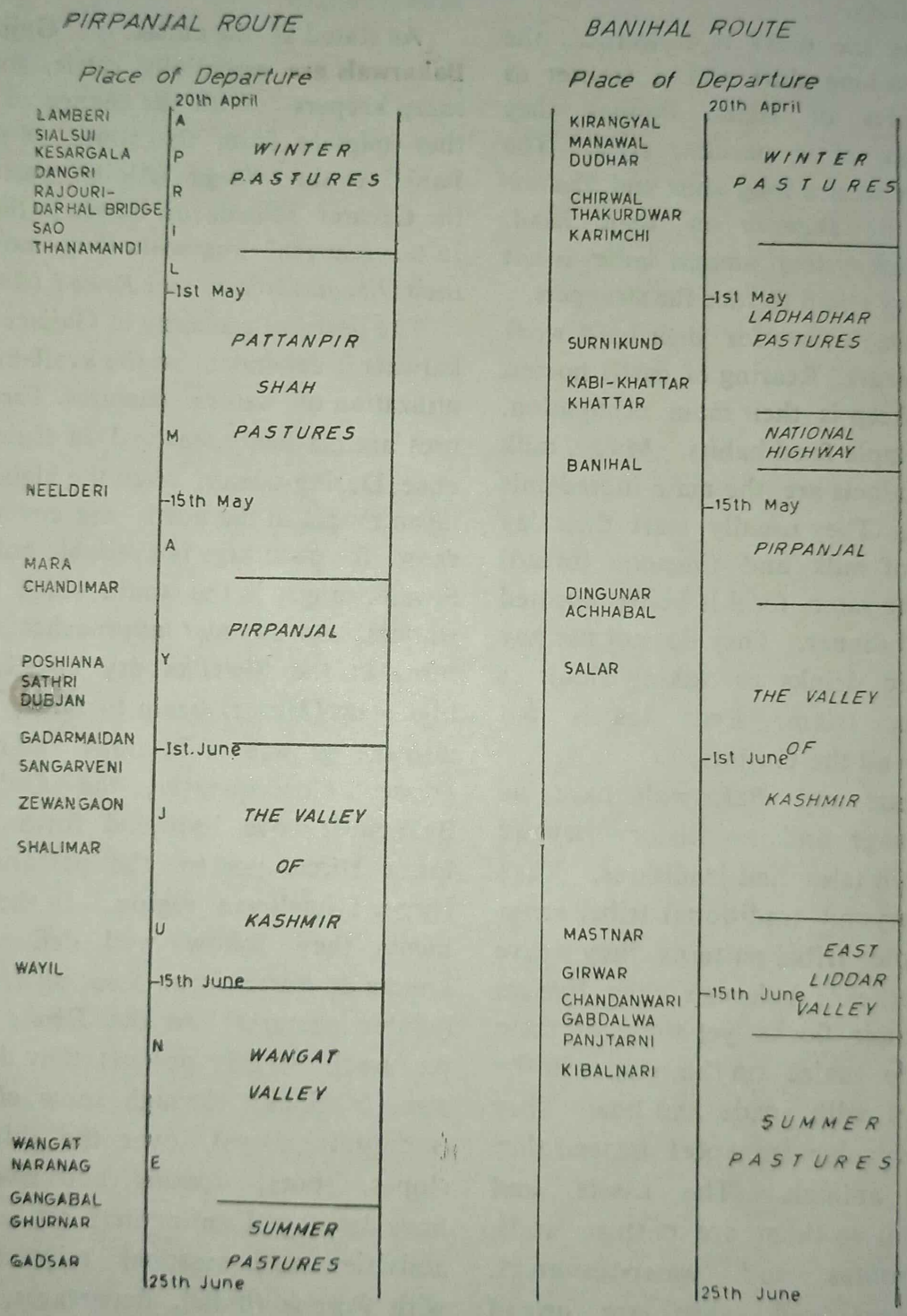
The Gujjars and Bakarwals have no written language and no history beyond word-of-mouth tales and jraditions. They have no art beyond traditional tribal songs and the simple tribal patterns they weave into their clothes. Although they live on products of their flocks yet some of them cultivate little maize on the slopes in the narrow valleys with spade and hoe. They donot use vehicular transport instead they use draught animals. The assets and resources vital to them are pasture lands, migration routes and water-resources. These resources and assets are owned commonly by the tribes and maintained collectively. They have a subsistence type of economy and try to produce everything they need in their daily need.

Transhumance

As stated at the outset the Gujjars and Bakarwals are essentially cattle, goats and sheep keepers. With the change of season they migrate from the south of the Pir-Panjal to the *Margs* (Alpine pastures) of the Greater Himalayan ranges in the north. In this seasonal migration they move with their *Khemas* (tents) and *Rewad* (flocks).

The pastoral economy of Gujjars and Bakarwals is dependent on the availability and utilization of natural pastures. These pastures are markedly seasonal in their occurrence. During winter, when the higher Himalayan ranges in the north are covered with snow, the pasturage is available only on the Siwalik-ranges in the south which has mild winters. As summer approaches the pastures in the Siwaliks dry up, but those higher up (*Margs*) begin to thaw, resulting into the growth of luxrious and nutritious grasses. Consequently, the Gujjars and Bakarwals move back and forth from the lower Himalayas to the pastures in the Upper-Himalayan region. In their movements, they follow well defined tracks known as *Rasto* from *Sardiyon ki Charageh* (winter pastures) to the *Dhoks* (summer pastures). In this process they drive large *Rewads* (flock) through snow clad *Galis* (mountain-passes), over the ridges, steep slopes, spurs, streams and rivers. They have developed an annual set schedule of activities, and seasonal migration along with *Paraos* (halts), departures, duration of occupation of different *Paraos* round the year.

TRANSHUMANCE
GUJJARS - BAKARWALS
1985



Source: 1. Modified after R.P. Khatana
2 Field Work by the author.

Fig. 11 - A

Fig 11 - B

The Gujjars and Bakarwals follow either the Pir-Panjal Pass or the Banihal pass Route in their seasonal migration. A brief description of these routes and the problems confronted by them on their way have been given in the following paras.

The Pir-Panjal Route

The *Qafilas* of Gujjars who follow the Pir-Panjal Pass route start in the third week of April and take about sixty days to reach the destination-*Dhoks* (Alpine pastures). Out of the sixty days 22 are journey days and 38 halt days. The *Qafilas* start from Lamberi and making halts at suitable pastures pass through Sialsui, Kesargala, Dangri, Rajouri, Saj, Thana-Mandi and Neelideri (Fig. 11-A), At Neelideri they stay for about two weeks and this period of stay is utilized for grazing. Salt etc. is given to sheep, the equipments are repaired and they purchase articles of household.

From Neelideri they move to Mara, Poshina, Chandimar and cross the stream of Chitta-Pani in which ice pieces flow with water. In this track they face a lot of difficulties in fording the Chitta-pani stream. Moreover, in this tract at the occurrence of rains and hails, the flocks face great hardship.

From Poshina they move to Gadar-Maidan, and it is in this tract where the Pir-Panjal Pass is crossed, Subsequently, they move from Gadar-Maidan to Sangerveni and then to Shalimar to the north-east of Srinagar. From Shalimar they proceed towards Wayil, Wangat and Naranag catchment. From Naranag the flocks ascend towards Gadsar. Gadsar is the summer base of this group and they graze their goats and sheep in the whole summer in the pastures situated in the vicinity of Gadsar (Fig. 11-A).

The Banihal Route

The Gujjars and Bakarwals who follow the Banihal Route also cover the distance from Siwaliks to Alpine pastures in about sixty days. On the way they break their journeys at twelve places (Fig. 11-B).

These *Qafilas* start their upward journey in the middle of April, preferably on Friday or Monday. They start from Kirangyal and break the journeys at Manawal, Katta (Ladhadhar intervening pasture), Surinkund, Kabikhattar, Khattar. Banihal. Dingunar, Achhabal, Salar, Masitnar, Girwar, Chandanwari, Gabdalwa, Panjtarni, Kibalnari and Sokhnalla (Fig. 11-B).

The journey between Khattar to Banihal is full of anxiety and tension as the flocks is to be taken on the Jammu-Srinagar National Highway. This is a continuous 23 hours Journey. The herdmen remain under tension on this track because of the fear of accidents, animal lifters and lack of fodder. This journey is broken at the Shaitani-Nalla (Banihal) for one day for rest after a long and hazardous journey. Crossing the Bahihal tunnel, the *Qafilas* enter the Valley of Kashmir and, through Verinag, Aishmuqam, reach Daksum, Chandanwari, Sokhnala pastures (Fig. 11-B).

The return journey for the winter pastures (Siwaliks of Jammu) commences in autumn in the month of September. It is the period when night temperature in the Alpine-pastures reaches fairly close to the freezing point and occurrence of frost is a common phenomena. The green pastures die under the impact of frost. Protection from cold is essential for the herds and

the herdmen and therefore they start descending for the winter pastures. The return journey also takes almost two month which is broken at the traditional *Paraos* (halts).

This oscillation of herds and herdsmen is a peculiar phenomena of the Gujjars and Bakarwals in the State of Jammu and Kashmir. It has its own merits and demerits. The flock and Bakarwals face a lot of difficulties while making risky and hazardous journeys through the snow covered passes and the busy National Highway. Nevertheless, this is a way of life which cannot be stopped completely. In fact, it is a way of life and there are cogent reasons behind the practice of transhumance. The climate, the terrain, their food habits, their needs, their self reliance and their land connections have a say on transhumance. The whole gamut of primitive society is interwoven with the flocks and their products. In other words their way of life, training of youth, social and political systems, the ceremonies and festivals, and in brief their philosophy of life are the products of cattle and flock rearing economy. This is when many of the new projects and plans initiated for their welfare could not bring the desired results. They cannot be sedentrized easily and therefore any scheme to bring change in their society should be gradual and smooth, causing least disturbance in their traditional mode of life.

REFERENCES :

1. H. N. Koul, 1958. 'A Survey of the Origin of People of Kashmir' *Kashmir Today*, Vol. II, 9, P. 18.
2. P. N. K. Bamzai, 1962. *History of Kashmir*, Delhi, p. 4.
3. V. Kumari, 1968. *The Nilmat Purana*, Vol. I. Jammu, PP. 22-23.
4. C. E. Bates, '*A Gazetteer of Kashmir*, Jammu, P. 1.
5. M. A. Stein, 1979. '*Kalhan's Rajtarangani*, P. 386.
6. G. M. D. Sufi, 1979. *Islamic Culture in Kashmir*, New Delhi, PP. 3-9.
7. S. C. Ray, 1970. *Early History and Culture of Kashmir*, PP. 26-34.
8. F. Drew, 1971. *The Territories of Jammu & Kashmir*, Delhi.
9. L. Rookh Rub, Race and Tribes—Culture of Kashmir, New Delhi.
10. W. R. Lawrance, The Valley of Kashmir, Srinagar.
11. Imperial Gazetteer of India, Vol. XV, 1908, London.
12. J. Pathik, 1980. 'Cultural Heritage of Dogras', New Delhi.
13. S. S. Shashi, *The Nomads of Himalayas*, Delhi, P. 20
14. M. K. Koul, 'Gujjars the Lords of Jungles' *Kashmir Today*, Vol. IV, 9, PP.7-8.
15. R. P. Khatana, 1985, 'Gujara-Bakarwal Transhumance in Jammu and Kashmir Himalayas : Responses of Spring Migrations', in *Geography of Jammu & Kashmir*, ed. M. Husain, New Delhi, PP. 86-115.
16. M. Husain, 1985. 'Major Ethnic Groups of Jammu & Kashmir' *Geography of Jammu & Kashmir*.
17. M. L. Lidhoo. 1985. 'Gujjars-Their Attitude Towards Social Changes, Education and Modernization, PP. 2-12.
18. A. Mam, 1974. *Hanjis of Dal Lake*, unpublished M.Phil. Dissertation, University of Kashmir.

CHAPTER — VI

Population

As discussed in the foregoing chapters, the State of Jammu and Kashmir has great diversity in its terrain, climatic conditions and resource base. These variations have resulted into uneven distribution of population. In fact, nearly 85 per cent of the total population of the State is concentrated in the Jammu plains, Jhelum-Valley and along the National Highways, while the remaining 15 per cent is sprinkled in the side valleys and *Kandi* lands. Contrary to this the Greater Himalayas, Zanskar and Ladakh are the negative areas and have insignificant distribution of population. Thus the spatial distribution of population shows a ragid environmental control.

The total population of the State as per the census of 1981 was 5.95 million. The growth rate of population between 1971-81 had been nearly 29 per cent which is higher to the national average of 24.81 during the same decade. The increase in population is a direct outcome of births and deaths as inmigration of people is very limited in the State. The agricultural density of population also reveals a close association with the fertility and the carrying capacity of land. Obviously, the density, like distribution is a function of many physico-socio-eeonomic and political factors.

Population Growth

In India the population census is being carried on since 1871, but reliable date on the population of Jammu and Kashmir is available only after 1951. In general prior to 1921, the population of the State grew at a slow rate. This was because the state experienced a number of famines and epidemics. After 1921, however, the population increased steadily, In 1951, just after the partition, the population of the State was 32.5 million. In 1961 it grew to 35.6 million, while in 1971 it increased to 46.1 million. According to the last census (1981) the total population of the State was 59.5 million (Fig. 12).

The phenomenal increase in the population of the State is because of a rapid fall in death rate. The development and extension of medical facilities have not only reduced the death rate, it has also increased the life span of people.

An analysis of Table 6.1 shows that the estimated population in 1951 was about

32.5 million. In 1951, owing to certain special condition no enumeration of population was done. Between 1951 and 1961

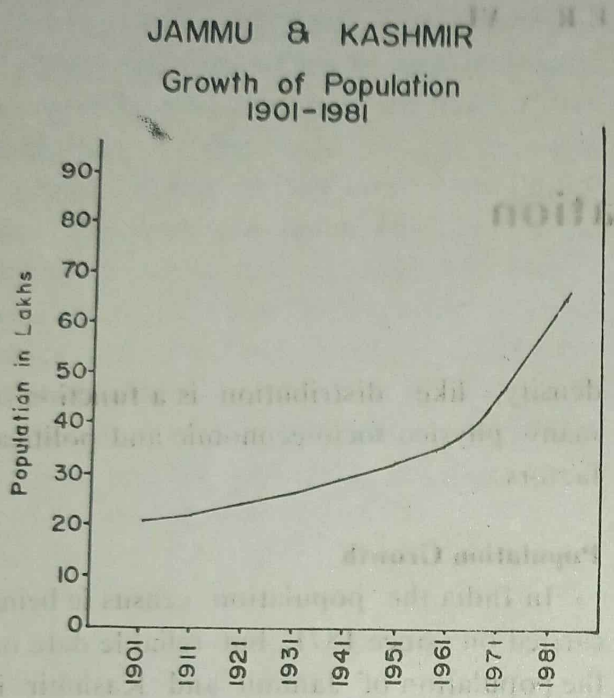


Fig. 12

the population grew by about nine and a half per cent. The increase in population had been phenominal between 1961-71 and 1971-81, showing a growth rate of over 29 per cent (Table 6.1). If the population continues to grow unchecked, there is a strong possibility that the State population may double (12 million) by the end of the present century. This stupendous growth of population may put enormous burden on the resource base of the State which may ultimately lead to human catastrophy and ecological imbalances.

As discussed in the foregoing paras the distribution pattern of population has been controlled closely by the terrain, availability of water, climate and fertility of soils. The district-wise distribution of population of the State has been given in Table 6.2.

An examination of Table 6.2 reveals that 52.58 per cent of the total population of the State is concentrated in the Kashmir Division and 45.20 per cent in Jammu Division, while only 2.22 per cent resides in the Division of Ladakh. Jammu and Srinagar Districts with 15.60 per cent and 12.11 per cent of the total population respectively have heavy concentration of population. In fact, Srinagar and Jammu cities are growing at a phenomenal pace. These cities being the centres of administrative and socio-cultural and economic activities, have better social amenities which attract people from the neighbouring towns and

Table 6.1

Jammu & Kashmir State—Growth of Population

Year	Population in million	Growth Rate
1951	32.5*	—
1961	35.6	9.54
1971	46.1	29.49
1981	59.5	29.06

*Estimated population

Source : Censue of India.

villages. Contrary to this the districts of Leh, Kargil and Doda have little attraction for the people as a result these areas are very sparsely populated.

The average density of population per sq. km. given in Table 6.3 gives a picture of the density of population and that of households. The average density of population of Jammu and Kashmir, calculated on the basis of comparable data was 59 persons per sq. km. as against the national average of 216 persons per sq. km. In other words the State is fairly sparesely populated as compared to the country as a whole. Within the State there are, however, glaring disparities in the density of population. There are four districts namely Srinagar, Jammu, Pulwama and Badgam in which the average density of population is much higher to that of the national level (Table 6.3). In Anantnag Baramulla, Kathua, Kupwara, Poonch, Rajouri and Udhampur also the density of population is over 100 persons per sq. km. There are three districts (Doda, Kargil, Leh) in which the density is much below the State level. Kargil and Leh with a density of 5 and 2 persons per sq. km. respectively are

Table 6.2

Population Distribution—District-wise—1981

District	Population	Percentage	Total
1. Doda	424,390	7.13	
2. Jammu	928,638	15.60	
3. Kathua	365,029	6.13	
4. Poonch	222,490	3.74	
5. Rajouri	298,830	5.01	
6. Udhampur	452,244	5.60	
Jammu Division	2,691,621	—	45.20
7. Anantnag	654,945	11.00	
8. Badgam	352,759	5.92	
9. Baramulla	669,405	11.24	
10. Kupwara	327,552	5.50	
11. Pulwama	404,351	6.79	
12. Srinagar	721,078	12.11	
Kashmir Division	3,130,090	—	52.58
13. Leh	67,733	1.14	
14. Kargil	64,566	1.08	
Ladakh Division	132,299	—	2 22
Total J & K State	5,954,010	100.00	100.00

Source : Census of India, 1981

the least populated districts of the State. The difficult terrain, harsh climatic conditions and poor accessibility are the main factors for this sparse distribution of population in these districts.

The number of households given in the third column of Table 6.3 also reveals an identical pattern. Srinagar, Jammu, Pulwana and Badgam districts have about 40 or more households per sq. km. The State average of households per sq. km. was 9.27 Doda, Kargil and Leh have less than 9.27 households per sq. km. and thus further supports the point of geo-ecological control on the density of households in the various administrative units of the State.

Population Characteristics

The size, age and sex composition, literacy rate, religious composition, occupational structure and migration are the major attributes of population which determine the economic development and social well-being of the respective population. In the following paras, a brief account of some of these characteristics of population of the State has been given.

Table 6.3

Jammu and Kashmir - Density of Population 1981

Unit	Density of Population per sq. km.	No. of Households per Sq. kms.
All India	216	38.79
J & K	59*	9.27
Srinagar	318	46.33
Jammu	305	52.63
Pulwama	289	41.76
Badgam	268	39.75
Anantnag	165	24.57
Baramulla	146	21.03
Kathua	139	23.19
Kupwara	138	21.47
Poonch	134	20.65
Rajouri	115	18.48
Udhampur	100	17.47
Doda	36	5.71
Kargil	5	0.88
Leh	2*	0.33

* Density has been worked out on comparable Area.

Source : Digest of Statistics, Directorate of Economics and Statistics, J. & K.

Age Structure

Age structure has a direct bearing on the occupational structure and dependency ratio of a population group. The age structure of the Jammu and Kashmir State has been plotted in the shape of pyramid in Fig. 13.

The age and sex pyramid of the State (Fig. 13) is typical of the underdeveloped societies i. e. a very broad base and a tapering top. Nearly 42 per cent of the State's population is below the age of 15 years and only 12 per cent above the age of 59. In other words, 43 per cent of the population is in active age group thus each worker is supporting 1.3 persons besides himself. This dependency ratio is fairly high when compared with that of the developed countries in which it is only 0.70 person.

Sex Composition

The role of an individual in a family or society is deeply associated with the age and sex. These are the visible and convenient indicators of social status and labour force. The sex-ratio of a social group is largely determined by a large number of bio-social factors which include the differential death rates among the two sex and the sex selective migration.

The State has a sex ratio of 899 females per thousand of males as against the national average of 935. Apart from biological factors, the low sex-ratio is owing to high mortality in females. The spatial distribution of sex ratio reveals a high degree of variation. For example, the Division of Kashmir has only 879 females per thousand of males, while in Jammu Division this ratio is 923. In Ladakh the sex ratio is at par to the State average, being 879. The Division of Kashmir in which 94 per cent of the total population is Muslim by faith has low literacy rate. Consequently, the femals babies are not properly cared which leads to high mortality rate. Contrary to this in Jammu Division Hindu population has high concentration in which high literacy and education lead to more care of females, affecting favourably the sex-ratio.

Literacy Rate

Literacy has been defined as the ability to read and write. Literacy reflects the socio-economic and cultural set up of a class or community. This attribute affects the fertility, mortality rates, marriages and the level of participation in the economic activities. Literacy accelerates the process of economic change and occupational

Table 6.4

Jammu and Kashmir State — Literacy Rate*—1981

	Literacy	Male	Female
Jammu and Kashmir	26.67	36.29	15.88
*All India Average	36.23	46.89	24.82

Source : Census of India, 1981

* The percentages have been calculated on the total population inclusive of the population in age group 0—4 years.

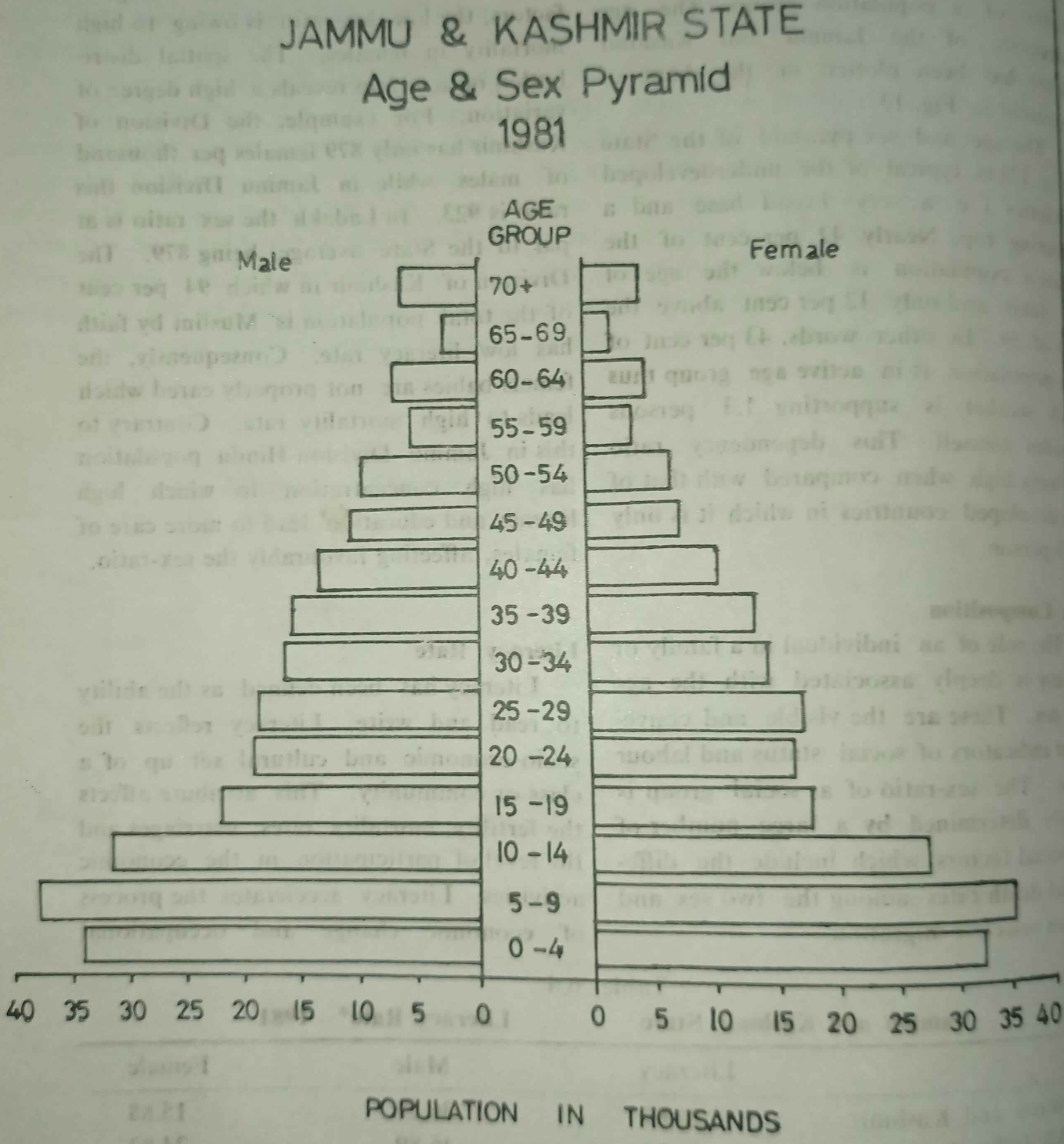

JAMMU & KASHMIR STATE
Age & Sex Pyramid
1981
AGE GROUP
Male
Female
70+
65-69
60-64
55-59
50-54
45-49
40-44
35-39
30-34
25-29
20-24
15-19
10-14
5-9
0-4
40 35 30 25 20 15 10 5 0 0 5 10 15 20 25 30 35 40
POPULATION IN THOUSANDS

Fig. 13

mobility from primary to secondary and tertiary sectors.

The literacy rate of the State has been given in Table 6.4.

An examination of this Table shows that according to the Census of 1981, 26.67 per cent of the total population of the State was literate as against 36.23 per cent for the country as a whole.

So far as the proportion of male and female literates is concerned about 36 per cent males and nearly 16 per cent of females were literate, while the national percentages are 47 and 25 respectively. The disparity level in literacy of urban and rural masses is obviously quite glaring. About 46 per cent of the urban population was literate and only 22 per cent of the rural masses were knowing the art of reading and writing. On the whole nearly 64 per cent males and 85 per cent females are illiterates. Literacy in rural areas of all the three Divisions (Ladakh, Jammu and Kashmir) is very low, and is even lower in the case of females. Uufortunately, there is an increase in the number of illiterates with the passage of time and growth of population. The economic development and human progress of a society is not possible without education. It is, therefore, imperative to provide this facility to the entire population of the State and efforts be made to educate the younger generation of the people like Gujjars and Bakarwals who practice transhumance. The socially backwarad and economically deprived people deserve especial attention for removing illiteracy from the tradition bound social groups of the State.

Religious Composition

Religion is an important feature of population. Throughout the history of mankind, it has furnished as motivating force. It is concerned mainly with the well-being of mankind on earth. All religions have left an imprint on the customs, art, literature, food - habits, politics and culture of mankind. It has been a divisive as well as a unifying force. The religious composition of the State has great social relevence and been briefly analysed in the following paras.

The religious composition of the Jammu and Kashmir State has been given in Table 6.5.

Table 6.5

Jammu and Kashmir State—Religious Composition

Division	Muslims %	Hindus %	Sikhs %	Budhists %	Others
Kashmir	94.00	4.42	1.20	0.05	0.33
Jammu	33.81	62.06	3 67	0.11	0 35
Ladakh	44.66	0.01	—	1.82	3.51
Total	65.84	30.41	1 06	1.26	0.19

The percentage distribution of the population by various religious shows that Muslims constitute about 65 per cent of the total population of the State. Hindus rank second with 30.41 per cent. There are 1.26 per cent Budhists, 1.06 per cent Sikhs and 0.19 per cent Christians, Jains and others.

Though Muslims have an overall majority but the Jammu Division has a very high concentration of Hindus and in Ladakh the Budhists constitute the dominant religious group.

In the Kashmir Division about 94 percent of the total population is Muslim by faith. Hindus and Sikhs come next with 4.42 and 1.2 per cent of the total population. There are veriations in the distribution of Muslims in the Valley of Kashmir. For example, there are five tehsils (Sonawari, Chadura, Karnah, Ganderbal and Bandipora) in which over 98 per cent of the total population is Muslim. In the remaining tehsils also the percentage of Muslims varies between 90-98, excepting Srinagar tehshil in which this percentage is 87.

The Division of Jammu, especially the southern plains are dominated by Hindus in which they constitute 62.06 per cent of the total population. Going northward in the Division the population of Muslims becomes significant. In fact, the tehsils of Kishtwar, Bhadarwah, Doda, Banihal, Ramban, Riasi, Gul-Gulabgarh, Naoshahra, Rajouri and Poonch have significant concentration of Muslim population.

Ladhakh is very sparsely populated. The Ladakh Division has about 52 per cent Budhists and nearly 45 per cent Muslims. In this Division Hindus and others are almost absent. The district of Leh a high concentration of Budhists while Kargil District is dominated by Muslims.

Occupational Structure

Occupational structure means the division of working population in different occupations and professions, The quality of work and the regulartity of employment in the primary, secondary and teritiary sectors reflect the economic development of a region. The total population of an area is sub-divided into: (i) the economically active, and (ii) inactive population. The economically active group is called as labour force or working population. Larger the size of workers, greater is the generating demand and an increase in services. This increasing demand ultimately stimulates the process of economic development within a region. In the Census of 1981 the work force was classified under three categories i.e. (i) Main worker if a worker, works for the major part of the year; (ii) Marginal worker if he has worked for less than six months; and (iii) Non-worker if he dose not participate in any economically productive work. Usually the age group between 15-59 is considered to be the working age group. On the basis of economic activity the work force of the State is divisible into several categories which have been given in Table 6.6.

An examination of Table 6.6 shows that in absolute terms there 1,815,571 main workers and 3,337,345 non - workers in the State, while 831,473 are marginal workers.

It may also be noted from this table that most of the workers are engaged in cultivation of crops, while the household industry

Table 6.6

Jammu and Kashmir State-Classification of Workers - 1981.

Cultivators.	Agricultural labourers	Household industry manufacturing ring, processing services & repairs.	Other workers	Total main workers	Marginal workers	Non-workers
Rural						
1004340	63540	96332	624802	1818571	831473	3337345
Urban						
29557	54976	64862	329862	1454040	801927	2471019
Total						
1033,897	63,540	96,332	624,802	1,818571	831473	3337345

and services are providing employment to very little proportion of the work force. The over-dependene on primary sector in State shows a stage of lope sided development.

The work force of the State has also been classified on the basis of the National Industrial Classification which has been given in Table 6.7.

Table 6.7

Jammu & Kashmir State—Classification of work-force-1984.

S. No.	Category of workers	Percentage
I	Cultivators	64.8
II	Agricultural labourer	3.1
III	Livestock, forestry, hunting, plantation, orchards and allied activities.	3.7
IV	Mining and quarrying	0.1
V	Manufacturing, processing, service and repairs (household and others.)	6.7
VI	Construction	2.3
VII	Trade and commerce	4.4
VIII	Transport, storage and communications.	3.3
IX	Other services	11.6
	Total	100.00

Source : Digest of Statistics J & K 1984.

In the State culivators constitute 64.8 per cent of the work force, while 3.1 percent are agricultural labourers. Nearly 4 percent is engaged in other primary activities i.e. livestock, forestry, hunting, plantation, archards, mining, quarrying and allied activities. A little over 2 per cent are dependent on construction while 7.7 per cent are engaged in trade, commerce, transport, communications and storage activities. Other services provide employment to 11.6 per cent of the total work force.

On the whole the State is in the initial stage of development and the work force is largely dependent on primary sector. There is an urgent need to develop industries so that the pressure on primary sector may be reduced. In fact, the development of industrial sector shall stimulate employment and thus will be a permanent source of income. For the development of industry a sound industrial policy needs to be evolved. The establishment of agro-based and small scale industries in the different parts can go a longway in giving the state a sound start in industrial development.

Urbanization

Urbanization is characterized by movements of people from small comnunities concerned chiefly or solely with agriculture to other communities, generally larger, whose activities are primarily centered in Government, trade, manufacturing or allied interests.

Urbanization is both a consequence and a casual factor in economic development. The rate of urban growth is an important index of the progress of the economy. In the present chapter, urbanization in the State of Jammu and Kashmir has been described briefly.

The State of Jammu and Kashmir has 79 per cent of its total population in villages and only 21 per cent in the urban areas. According to the Census of 1981, there are 56 urban centres. In absotute terms the total urban population in 1971 was 858,221 which grew to 1,260,403 persons in 1981. This shows an increase of 2.41 per cent in urban population in the year 1971-81 decade.

The size of urban towns and the pattern of their spatial distribution reveal a highly ill-balanced picture. There are 31 towns and urban places in the Jammu Division and 23 in Kashmir Division, while Ladakh has only two towns (Leh, Kargil). Jammu Division with 31 towns has only 33.33 per cent of the total urban population while the 23 towns of Kashmir Division are inhabited by 65.70 per cent of the total urban population of the State. In Ladakh only 0.97 percent of the urban populotion resides (Table 6.8).

Urban Places of Jammu Division :

The towns and urban places of Jammu Division are located mainly in the Jammu plains on the slopes of the hills. Most of the towns are situated along the National Highways and the rivers. Jammu, Udhampur, Kathua, Ramban, Batote, Banihal Rajouri are the examples of such towns. The towns situated along Jammu - Srinagar National Highway are showing steady growth. Centrary to this the towns which have poor connectivity are showing stunted growth. The towas of Doda, Kishtwar, Bhadarwah, Karnah, Poonch are showing

Table 6.8

Jammu & Kashmir State - Urban Places - 1981

Division	Percentage of urban population	No. of urban places	Names of urban places
Jammu	33.33	31	Akhnoor, Arnia, Banihal, Baribrahmani, Basohli, Batote, Bhadarwah, Billawah, Bishna, Chenani, Doda, Hiranagar, Jammu* Kathua, Katra, Kishtwar, Lakhanpur, Nowshera, Parole, Poonch, Ramban, Ramnagar, Ranbirsinghpura, Rajouri, Riasi, Ratanbal, Samba, Thanamandi, Udhampur, Vijaipur.
Kashmir	65.70	23	Achabal, Anantnag, Badgam, Bandipore, Baramulla, Bijbahera, Charisharif, Ganderbal, Gulmarg, Handwara, Kukarnag, Kupwara, Mattan, Pahalgam, Pampore, Pattan, Pulwama, Qazigund, Shopian, Sopore, Srinagar*, Shopian, Sopore, Tral, Uri.
Ladakh	0.97	2	Kargil, Leh.

Source : Census of India - 1981.

*The urban agglomeration of Srinagar includes Srinagar city and Badamibagh cantonment, while the Jammu urban agglomeration includes Jammu city and Jammu cantonment.

stagnant growth. Another characteristic of the Jammu urban population is that over 53 per cent of the total urban population resides in Jammu urban Agglomeration. Rajouri and Poonch are the least urbanized districts of the Division. The low level of urbanization of these districts may be attributed to their geo-political location which is not conducive for heavy investment in industries and urbanization.

The urban growth pattern of towns of Jammu Divisions has been shown in Table 6.8.

So far as the decadal growth of urban centres is concerned there was only one town (Jammu) in the region in 1901.

Table 6.9

Jammu Division - Urbanization Trend

Size and class	1901	1911	1921	1931	1941	1951	1961	1971	1981
City (100,000 or above)	...	...	...	...	...	...	1	1	1
Large Towns (50,000—99,999)	...	...	...	...	1	1	...	...	...
Medium Towns (20,000—49,999)	1	1	1	1	...	...	...	...	2
Small Towns (10,000—19,999)	...	...	...	...	...	...	...	2	3
Urban Village (5,000—9,999)	...	2	2	2	2	2	1	7	9
Urban Hamlets Below 5,000	...	15	10	11	11	11	19	14	16
Total	1	18	13	14	14	14	23	25	31

Source : Data computed from census of India 1981.

Between 1911-21, there had been slower growth. It was after 1931 that a steady increase in the urban places was recorded. In 1981, sixteen urban hamlets, nine urban villages, three small towns, two medium towns and one city was recorded (Table 6.9). The major occupation of the urban population is trade, commerce, transport, communication, services and manufacturing activities.

Urban Places of Kashmir Division :

In Kashmir Division there are 23 urban places. Most of these urban places are situated in the plains of Jhelum, *Karewas* and the *Kandi* tracts. Srinagar district has the largest urban population and the district of Kupwara the lowest. Moreover, Srinagar city alone has 73.18 per cent of the total urban population of the Division. Between 1901 and 1921 there had been a sluggish growth of urban places in the Division but after 1921 the towns grow steadily, while post independence period recorded a rapid growth in the urban population (Table 6.10).

A comprehensive picture of decadal growth of urban places has been given in Table 6.8. This Table reveals that in 1901 there was only one town (Srinagar) while in 1981 the urban places grew to 23. At the time of the last Census (1981) there were seven hamlets, nine urban villages, three small towns, three medium sized towns, no larger town (population 50,000-100,000) and only one city (Srinagar).

A peculiear feature of urban population of the Kashmir Division is that in ten places (Bandipore, Handwara, Kukarnag, Kulgam, Mattan, Pahalgam, Pampore, Sopore, Tral,

Uri) most of the people are engaged in primary occupations. In the remaining places industrial activities and services out number the primary activities.

Ladakh Division :

In Ladakh Division there are two urban places, namely, Kargil and Leh. It is interesting to note that about 45 per cent of the total population of Kargil and Leh towns is dependent on primary activities, about 16 per cent work in transport, 31 per cent in services, 6 per cent in construction and only 3 per cent is dependent on manufacturing.

Table 6.10

Kashmir Division - Urbanization Trend

Size and class	1901	1911	1921	1931	1941	1951	1961	1971	1981
City (over 100,000)	1	1	1	1	1	1	1	1	1
Large Towns (50,000—99,999)	...	...	...	...	...	...	...	...	...
Medium Towns (20,000—49,999)	...	...	...	...	...	...	...	...	...
Small Towns (10,000—19,999)	...	...	...	2	3	3	2	...	3
Urban Village (5000—9999)	...	3	3	1	...	3	3	7	9
Urban Hamlets (below 5000)	...	3	3	1	...	3	3	7	9
Total	1	12	7	9	9	8	12	16	23

Source : Computed from the Census of India 1901-1981

REFERENCES :

1. *Census of India* 1971, J. & K.
2. National Council of Applied Economics Research 1969, *Technoeconomic Survey of J. & K.*, New Delhi.
3. *Gazetteer of Kashmir and Ladakh*, 1974.
4. *Census of India 1981*, Series 8- J. & K., Provisional Population Tables.
5. B. Zutshi, 1985 ' Population Distribution of Jammu and Kashmir - A Regional Analysis in '*Geography of Jammu and Kashmir*' edtd. M. Husain - et al. New Delhi, PP. 199-213.
6. M. Siddique, 1985 'Urbanization in Jammu & Kashmir - A Reginol Analysis' in '*Geography of Jammu & Kashmir*' edtd. M. Husain et. al. New Delhi, - PP. 215-238.
7. S. N. Agarwala, 1972, *India's Population Problem*, Delhi.

PART III

ECONOMY

CHAPTER — VII

Irrigation and Power Projects

Irrigation has been defined as the distribution of water to land by artificial means in order to enable or enhance the growth of crops. This artificial water may be supplied by canals, wells, tube-wells, tanks etc.

The sub-tropical and temperate latitudes in which the State of Jammu and Kashmir is situated, experience the extremes of weather and climate (Chapter 2). The scroching heat in summer in the Jammu plains, the erratic behaviour of summer monsoon in the Valley of Kashmir and the arid conditions of Ladakh force the farmers to irrigate their crops, wherever irrigation facilities are available. As a matter of fact, in Ladakh crops are grown during summers in small alluvial tracts only with the help of irrigation.

Irrigation, the process of artificial supply of water to crops is an age old practice in the State, especially in the valley of Kashmir. The farmers are conscious of the importance of irrigation as a means to achieve an effective break through in the development of agriculture. It is reflected in the eagerness with which some of the *Kuls* (canals) were constructed by the farmers in the past. After independence several irrigation projects were envisaged and completed as a result of which the area under irrigation has increased significantly. The area irrigated in the three Divisions of the State has been given in Table 7.1

Table 7.1

Jammu & Kashmir State - Irrigated Area-1984-85

Area in thousand hectares

Division	Total cropped area	Area irrigated	Percentage to total cropped area
Jammu	576	144	25.00
Kashmir	381	233	61.15
Ladakh	19	19	100.00
Total	977	396	40.53

Source : Digest of Statistics, J. & K. 1984-85

It may be seen from Table 7.1 that about 40.53 per cent of the total cropped area of the State is irrigated. In Ladakh the entire cropped area (19,000 hectares) is dependent on irrigation, while in Jammu and Kashmir Divisions 25 per cent and 61 per cent of the total cropped area is irrigated respectively.

The decadal growth in the sources of irrigated and the total area irrigated by each source has been given in Table 7.2.

Statistics about the area irrigated and the source of irrigation given in Table 7.2 show that canals are the dominant source of irrigation in the State. In fact, canals irrigate 305 thousand hectares out of the 324 thousand hectares of irrigated land. The share of canals in irrigation as per the statistics of 1984-85 is over 94 per cent.

So far as the extension in the sources of irrigation is concerned, in 1950-51 the total irrigated area was 261 thousand hectares which in 1984-85 has increased to 324 thousand hectares, recording an increase of 24 per cent. The mountainous topography and non-availability of underground water in many of the fertile agricultural tracts are the major obstacles in the development of canals and tubewells in the State.

The districtwise area irrigated by canals has been given in Table 7.3 to ascertain the intensity of canal irrigation in the different districts of the State.

The overwhelming dominance of canal irrigation may be seen from the fact that in ten out of the fourteen districts of the State, canals irrigate 92 to 99 per cent of the total irrigated area. The districts of Anantnag, Badgam, Srinagar, Pulwama, Baramulla and Knpwara of the Kashmir Division and Jammu and Doda Districts of Jammu Division have elaborate canal networks and over 9/10th of their irrigated area is under the command of canals.

In the State there are several networks of canals constructed by *Zamindars* (Land lords and farmers). A brief description of the major canals of the State is given in the following lines.

Kashmir Division

The valley of Kashmir is drained by the Jhelum and its tributaries. Descending from the surrounding mountains the river of Jhelum and its tributaries flow through the *Karewas* and the levelled plains of the Valley. The most notable use of the water potential of Jhelum in the valley bottom is for irrigation.

In the Division of Kashmir canals constitute the dominant source of irrigation. These canals are divisible into (i) *Zamindari* - canals (Kul), and (ii) Government constructed canals. The *Zamindari* canals, locally known as *Kuls* are constructed and maintained by the farmers. The total number of such canals is 2827 which irrigate nearly 61.15 per cent of the total irrigated area of the Kashmir valley. Out of these 2,827 *Kuls* 259 have been taken over for maintenance by the State Irrigation Department. The major State owned canals are (i) Martand (ii) Zainagir.

(i) *The Martand Canals* - This is one of the oldest canals of the State. It is said that it was originally constructed in the 8th century A. D. by the King Lalitaditya which got extended by the subsequent rulers. It has been taken off from the left

Table 7.2

Jammu and Kashmir State - Area irrigated (000 ha.)

Year	Canals	Wells/ tubewells	Tanks	Other sources	Total
1950-51	244.00	3.00	3.00	11.00	261.00
1960-61	256.00	5.00	—	13.00	274.00
1970-71	271.00	1.00	2.00	9.00	283.00
1980-81	285.00	2.00	4.00	13.00	304.00
1984-85	305.00	3.50	3.10	12.40	324.00

Source : Digest of Statistics, Table 4, J & K State 1984.

Table 7.3

Jammu & Kashmir State - Districtwise Irrigation (000 hectares)

District	Total area irrigated	Area irrigated by canals.	Percentage
1. Anantnag	47.30	46.59	98.50
2. Pulwama	37.37	36.27	97.05
3. Srinagar	19.26	18.26	94.80
4. Badgam	34.09	33.64	98.68
5. Baramulla	44.71	41.61	93.07
6. Kupwara	22.87	21.22	92.79
7. Leh	9.99	9.99	100.00
8. Kargil	8.75	8.75	100.00
9. Jammu	59.00	55.85	94.66
10. Udhampur	6.00	4.83	80.50
11. Doda	6.68	6.46	96.71
12. Kathua	19.18	15.58	81.23
13. Rajouri	4.91	2.35	47.86
14. Poonch	3.89	3.36	86.37
Total	324.00	305.00	94.14

Source : Digest of Statistics, J & K 1984.

bank of the Liddar river and its Headworks lie at Ganeshpur. The total length of the canal is about 50 kms. and it has 9,500 acres of land under its command. The low lying and plain areas of the Anantnag district are irrigated by Martand canal. The canal terminates in the *Karewa* of Martand and most probably its name has been derived from the Karewa through which it flows and terminates.

(ii) *The Zainagir Canal* - In the Fifteenth Century A.D., the Zainagir canal was constructed by Sultan Zain-ul-Abidin. This canal has been excavated from the Madhumati river (A left hand tributary of Jhelum). The canal has been constructed along the northern side of the Wular-lake through Sopore and Zainagir. It provides water to the paddy fields and orchards of Baramulla District and has about 13,300 acres of area under its command.

The net work of *Kuls* is quite dense which gives the impression of a labyrinth (Fig. 14). Some of the important *Kuls* of Kashmir are Sharakhul, Shahkhul, Sumbal, Nandi, Zainpur, Awantipore, Kayal,

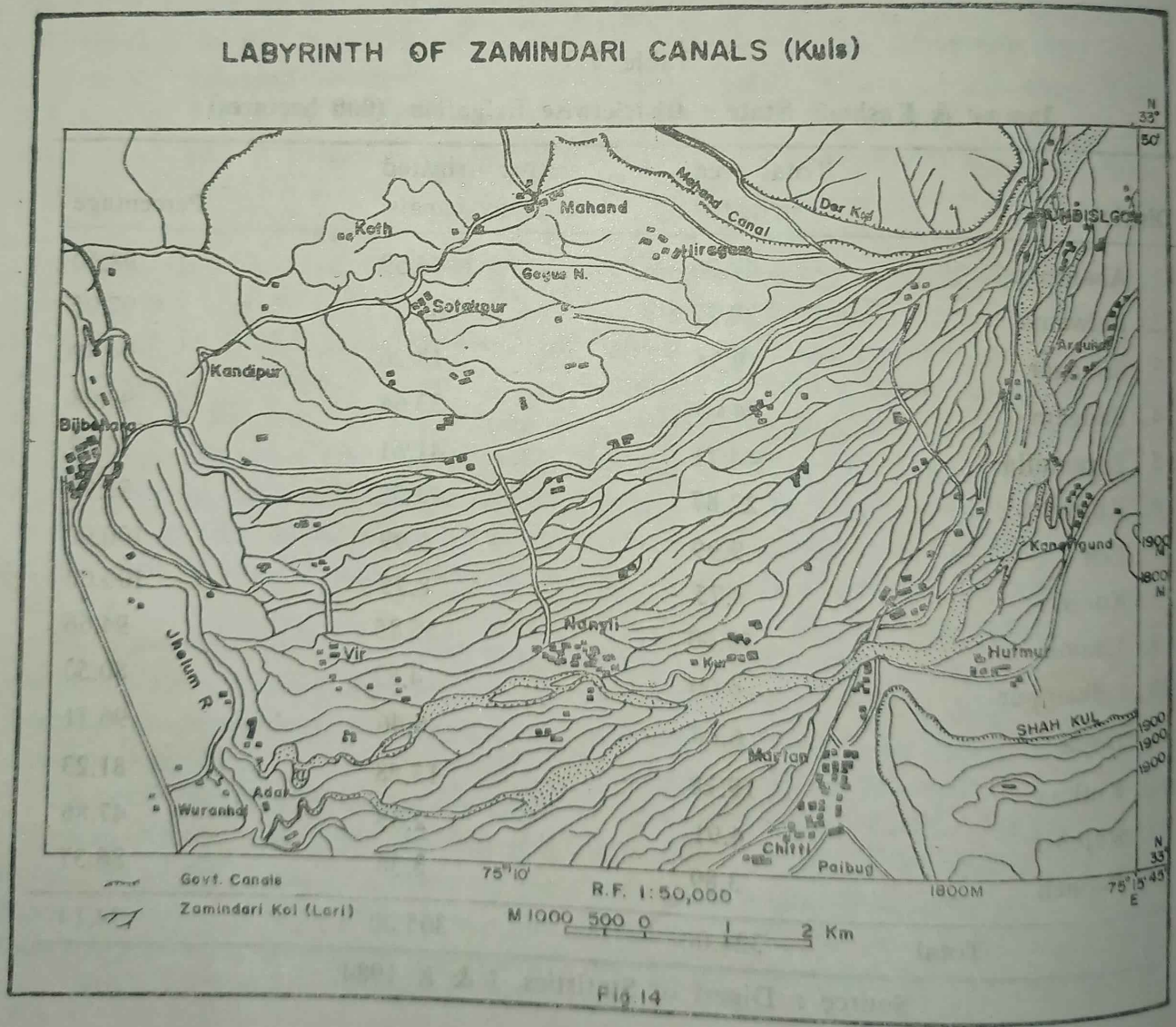


Fig 14

Rishipura and Babul. At the occurrence of water scarcity, the villagers regulate the supply through *Rahviks* (watchmen). The *Rahviks* committee is formed by the villagers.

Throughout the history, the *Zamindari* canals have been of immense assistance in saving the crops and are still useful in providing water to the crops. But after the abolition of *Zamindari* - system many of them have not been properly maintained. Such canals which have been ignored are proving to be a menace to the adjoining agriculrural areas. At the occurrence of heavy rains and melting of snow, they spill over and submerge the adjacent fields, many a times causing serious damage to standing crops. Recently, a comprehensive plan has been prepared for their restoration and maintenance. Efforts however, need to be made to extend these canals in the dry farming areas, especially in those *Karewas* which are devoted to maize cultivation. Such *Karewas* if provided with irrigation may be used for the cultivation of more valuable crops (paddy, oilseeds, orchards).

Jammu Division

The Division of Jammu is drained by the Chenab, Ravi, Tawi, Ujh, Basantar, Manawar Tawi, Poonch Tohi, Basantar, Tohi and Neru rivers. Many of these are hill torrents and discharge little quantities of water during the summer and winter seasons. Wherever possible, the water of these rivers have been utilized for irrigation. Some of the important canals of Jammu Division have been described briefly in the following paras:

The Ranbir Singh Canal

The Headworks of Ranbir Singh canal is located at Akhtoor on the left bank of Chenab. Passing southward it has been taken across the Tawi river with the help of an aquaduct. The fertile plains of Jammu and Ranbirsinghpura are under its command. The total command area of Ranbir Singh canal is over one lakh acres. This canal and its distributries have helped appreciably in the adoption and diffusion High Yielding Varieties of rice and wheat in Jammu plains, especially in the Tehsil of Ranbirsinghpura.

The Pratap Canal

Taken out from the right bank of the mighty Chenab, at Akhtoor, the Chenab canal has a total length of 36 kms. About 20,000 acres of Akhnoor Tehsil are under its command. Rice. wheat, oilseeds, fodder and vegetables are the major crops irrigated by Pratap Canal.

The Ravi - Tawi Irrigation Complex

A comprehensive project has been designed to connect the Ravi and Tawi waters for irrigation purposes. On completion this project will irrigate about one and a half lakh acres of land in the *Kandi* and plain areas of the Jammu Division. The complex is based on the gravity canals and lift irrigation projects which is expected to cost about Rs. 70 crores. The project consists of : (a) the Ravi Canal, and (b) Tawi Lift Irrigation project.

(a) The Ravi Canal

The Ravi canal has been taken out from the right bank of the Ravi river at the Shahpur - Kandi Barrage.

Moving in a north-east to southwest direction, the main canal is 76 kms. long. It has been linked with the Tawi Lift Project at Vijaipur. Efforts are being made to transfer the water of Kathua canal into Ravi canal at Lakhanpur. In its middle course a 356 M. long barrage is to be constructed on the Ujh river and the main canal. After completion the project will assure cultivation of High Yielding Varieties of rice and wheat in the Jammu and Kathua Tehsils.

(b) The Tawi Lift Irrigation Project

A lift station has been constructed on the left bank of the Tawi river near Bahu-Fort. At this point the water of Tawi river is raised to a height of about 31 metres by lift pumps and fed into the main canal. The main canal has a length of about 29 km. which has been constructed from Jammu to Ramgarh. It commands about 15,000 acres of the Jammu, Bishna and Vijaipur blocks.

In the southern plains of Jammu a number of tubewells operated by the diesal pumps or hydal power have been installed. About 2100 hectares of arable Land is irrigated by tubewells in the Jammu Division.

Ladakh Division

Owing to scanty rains and high rate of evaporation the cultivation of crops is entirely dependent on agriculture. Many of the farmers have individual water channels to irrigate their field. Moreover, there are several small canals locally known as *Mayur* which irrigate relatively larger tracts of cultivated land.

(i) The Chuchot Mayur (Canal)

The Chuchot - Mayur has been taken out of the left bank of the Indus at the Stakna. It commands about 200 acres of Chuchut, Gongma, Shama, Yokma and Balam Villages. Wheat, *grim* (a type of barley) and vegetables are the dominant crops irrigated by the Chuchot - Mayur.

(ii) The Thiksay Mayur (Canal)

The Thiksay Mayur has been dug from the right bank of the Indus river. It provides water to the village of Ranbirpora, situated on a low terrace of Indus. About 120 acres of cultivated area of Ranbirpora is under the command Thiksay canal.

Tank Irrigation

Nearly 3100 hectares of arable land of the State are under tank irrigation. Tank irrigation is confined to isolated tracts in the districts of Anantnag, Pulwama, Srinagar, Badgm and Kupwara. Tank irrigation is however, insignificant in the Jammu Division as only 90 hectares are irrigated in Poonch District.

Rice and wheat are the dominant crops irrigated. Rice alone constitutes over 60 per cent of the total irrigated area, followed by wheat which covers obout 13 per cent of the gross irrigated area. Maize, pulses, oilseeds, millets, orchards and vegetables are the other crops irrigated in the State.

Power Development, Consumption and Potential

Pawer is the key to high level of economic development. Its level of consumption in any country is a significant

Table 7.4

Jammu & Kashmir State - Crops Irrigated 1983-84

Crop	Area in hectares	Percentage
1. Rice	2,45,000	60.49
2. Maize	16,000	3.95
3. Wheat	52,000	12.84
4. Pulses & Millets	16,000	3.95
5. Other food crops	21,000	5.19
6. Other non-food crops.	55,000	13.58
Total	4,05.000	1,00.00

Source : Computed frcm the Digest of Statistics, J&K Govt.

indicator of development. As for instance U. S. A. which is economically one of the most developed countries claims a per capita consumption of 8,487 units per day. In sharp contrast is the Indian average percapita consumption of 133 units. In the State of Jammu and Kashmir it is even much less with only 93 units percapita per day. This state is among the most backward States of India and will continue to stay in this state of backwardness unless adequate steps are taken to improve its power situation. The State is poor in coal (Chapter 4) and because of the unfavourable geological structure, the prospects of striking gas and petroleum are not very promising. It has however, tremendous potential for hydal generation which has been tapped inadequately. In the following paras the water power development has been described.

Hydel Power

The three mighty rivers viz. Indus, Jhelum and Chenab and their numerous perennial tributaries which drain the State open up immense opportunities for the generation of hydroelectricity. It has been estimated that these rivers provide theoretically a potential of 13,000 MW of hydel power generation. The major hydel projects, their installed and effective capacities have been given in Table 7.5.

The electric power available from the above sources is 956 MUs per year which is inadequate to meet the present demands of primary, secondary and tertiary sectors.

The State is connected to the Northern Grid by two 220 KV A/C Lines - One between Sarna and Udhampur and the other between Sarna and Gladni to be extended to Salal Hydro-Electric Project (HEP). These two lines have a carrying capacity of 243 MWs only. Further the regions of Jammu and Kashmir are connected by a D/C 132 KV line between Udhampur and Bemina. The NHPC is also constructing one more D/C 400 KV Line between Udhampur and Srinagar which is expected to be completed by the end of the VII Five year Plan.

Table 7.5

Status of Electric Power in Jammu & Kashmir State—1985

Division	Project	Installed capacity	Effective capacity MW Summer	Winter
A-Jammu	(i) Chenani	25	20	12
	(ii) Kalakote (Thermal)	21.4	—	4
	(iii) Other small stations	3.0	2	17
B-Kashmir	(iv) L. Jhelum H.P	105	105	65
	(v) U. Jhelum Stage I.	22.6	22	17
	(vi) Ganderbal	15.0	12	10.5
	(vii) Mohra	9	7	7
	(viii) Bemina and others.	6	—	4.5
C-Imports	State Share from B.B.M.	—	27	27
	Grand Total	208.1		

Source : Energy Planning Wing, Govt. of Jammu & Kashmir.

Potential Hydel Power

Ladakh Division :

The Kargil and Leh Districts of Ladakh Division are traversed by the Indus and its tributaries (Shyok, Zanskar, Suru). The main Indus-river drains the range between Ladakh and Karakoram. Its catchment at Karu is 3840 sq. kms.

On the basis of meagre data available about the Indus river, it is estimated that this river has an annual flow of about 13 lakh Aft. Although data on the discharge of Zanskar is not available, it appears that its annual discharge at Nimu (Leh District) would be more than that of Indus at Leh. The Shyok river has a similar pattern of discharge. All these rivers have a steep gradient descending from a height of about 4,300 metres to about 2,500 metres. The annual flow of these rivers gives a mean discharge of 9,500 cusecs, which may generate 3,000 MW/years. This hydel potential is to be harnessed for a rapid development of Ladakh Division.

Kashmir Division :

The outflow of the Jhelum river draining Kashmir valley at Baramulla is of the order of 9,000 cusecs. Moreover, the Kishan-Ganga which drains the northern slopes of Dholadhar Mountain and Southern slope of Nanga Parbat brings an additional flow of 1,290 cusecs. Most of this water reaches in it from about 3,500 metres to 1200 metres. The Jhelum river as such has theoretical hydel potential of 3000 MW/years. Work on various projects is under progress. The completion of the Uri-Project will ease the electricity

shortages appreciably, and therefore deserves special attention of the government.

Jammu Division :

Traversed by the mighty Chenab, Jammu Division is more richly endowed in hydel energy potential than other parts of the State. Theoretically this river has hydel potential of about 500 MW/years. The completion of Salal and Dul-Hasti Projects will go a long way in overcoming the deficiency of electricity in the State.

REFERENCES :

1. R. O. Buchanan, 1974, *An Illustrated Dictionary of Geography*, Mc Graw-Hill. Singapore.
2. Govt. of India, Irrigation and Power Projects, Ministry of Irrigation and Power, New Delhi-1970.
3. Govt. of India, *Irrigation Atlas of India*, Ministry of Irrigation and Power, New Delhi-1970.
4. Govt. of J & K, *Digest of Statistics*, 1984.
5. A. K. Koul, *Home Geography*, 1985.
5. S. M. Alam, M. Husain, 1986, 'Energy Scenario in the State of Jammu and Kashmir, TERI Publication.

CHAPTER — VIII

Land - Use and Agriculture

The domestication of plants and animals is know as agriculture. Still most of the population of the world is dependent on agriculture, consequently, the productive plains are the areas of high concentration of population and the State of Jammu and Kashmir is no exception to this. The outer plains of Jammu and the fretile Valley of Kashmir are intensively cultivated while the dry plateau of Ladakh and lofty mountainous areas of Jammu and Kashmir are almost uncultivated.

Cultivation of crops is the dominant occupation in Jammu and Kashmir. Farming, directly or indirectly supports about 81 per cent of the total population of the State. It contributes nearly 60 per cent of the State revenue which adequately explains the over dependence of the State on agriculture.

The total area of the State is 2.23 lakh sq. kms. out of which about 1.39 lakh sq. kms. is on this side of the ceasefire line. About 92 per cent of the geographical area of the State consists of high mountains and only about 5 per cent is available for cultivation. A general picture of land use of the State has been given in Table 8.1.

An analysis to Table 8.1 shows that a little over 27 per cent of the total area of the State is under forest and about 30 percent is available for cultivation. Permanent pastures and culturable waste cover 5.16 and 5.90 per cent of the area respectively, while 14 per cent is put to non-agricultural uses. A little over 9 per cent is barren land and nearly 4 per cent is fallow. The forest area is however, shrinking at a faster rate which in several districts of the Valley. (Pulwama, Badgam and Srinagar) has reached the critical limit of ecological equilibrium.

Cropping Patterns

The agricultural systems and cropping patterns of a region are largely governed by the terrain, slope, nature of soil, the prevailing agro-climatic and socio-economic conditions. In general in the State of Jammu and Kashmir the cultivators practice intensive subsistence agriculture excepting the saffron and orchard growers.

Cropping pattern has been defined as the proportion of area under various crops at a point of time. The statistics of crops are used to denote cropping patterns. It is.

however, a dynamic concept which changes in space and time. In fact, no cropping pattern can be good and ideal for all times to come.

The State of Jammu and Kashmir has micro level variations in agro-climatic conditions. Consequently, the cropping patterns and crop combinations differ significantly at the meso and micro levels. The Jammu plains' landscape is dominated by wheat, rice, pulses, maize, oilseeds and fodder, the Valley is well known for paddy, saffron and orchards cultivation, while in Ladakh *grim* (a type of barley) and vegetables are the main crops (Table 8.2.)

By and large the cropping structure of the State shows a subsistence character. Rice, maize and wheat, the three staple food crops of the State occupy over 83 per cent of the gross cropped area. Rice is the leading crop, occupying 30 per cent of the cropped land followed by maize and wheat, which are sown in about 30 and 23 per cent of the total cropped area respectively. Millets, *Bajra*. pulses, fodder, orchards and vegetables are the other important crops grown in the State (Table 8.3).

A districtwise analysis of area under different crops shows that rice dominates in Jammu, Anantnag, Baramulla, Pulwama, Kathua and Badgam. In each of these districts at least 10 per cent of the gross cropped area is under paddy cultivation. Its cultivation is altogether absent in Leh, Kargil (Ladakh), while in the remaining districts it occupies less than 6 per cent of the cropped area.

So far as the distributional pattern of wheat is concerned, its high concentration lies in Jammu (42.46%), Kathua (19.36%), Udhampur (15.58%) and Rajouri (11.60%). In the Valley of Kashmir the process of its diffusion has been started but still none of the districts has even 1 per cent of the cropped area under its cultivation, excepting Badgam in which a little over one percent of the gross cropped area is devoted to wheat.

Maize is a significant crop of the State and its major concentration sprawls in the *Kandi* areas. In the districts of Udhampur, Doda and Rajouri its share in the total cropped area is 17, 14 and 13 per cent respectively. Poonch, Kathua, Jammu, Kupwara, Baramulla, Badgam, Anantnag and Pulwama are the other districts of its high concentration. In the remaining districts (Leh, Kargil, Srinagar) maize is an insignificant crop.

Rice : (Oryza Sativa)

Rice thrives well in the hot and moist climate. In the Valley of Kashmir warm and moist conditions prevail from May to August, and this period records mean monthly temperature over 20°C with adequate rains. The period is thus ideally suited for rice cultivation. Deep fertile clayey soils that turn into soft mud when puddled and develop cracks when dry are also considered conducive for the cultivation of rice. Such soils are found in the Jammu Plain and in the Kashmir Valley.

In the Valley of Kashmir rice is generally transplanted in the third week of May, while in the outer plains of Jammu Division its transplantation takes place in the beginning of July after the onset of summer monsoon, and the crop is harvested in September and

Table 8.1

Jammu and Kashmir - General Land Use-1984-85

Area in - 000 hectares.

Use of land	Area in hectares	Percentage of total area of the State
1. Forest	658	27.19
2. Net area sown	7.5	29.53
3. Land put to non-agricultural uses.	339	14.00
4. Barren land	227	9.37
5. Permanent pastures and other grazing grounds.	125	5 16
6. Land under Misc. trees and other groves.	109	4.50
7. Culturable waste	143	5.90
8. Fallow other than current fallow.	8	0.33
9. Current fallow	91	3.75
Total	2422	100.00

Source : Revenue Deptt. J & K, Srinagar.

Table 8.2

Jammu & Kashmir State-Area Under Different Crops 1983-84

Crop	Area in thousand hectares	percentage
1. Rice	274.36	30.06
2. Jowar (Millets)	16.14	1.77
3. Bajra	20.34	2.23
4. Maize	272.88	29.90
5. Wheat	212.78	23.31
6. Barley	10.66	1.17
7. Pulses	48.86	5.35
8. Sugarcane	0.78	0.09
9. Fruits and vegetables	54.10	5.92
10. Other food crops	1.91	0.20
Total	912.81	100.00

Source : Digest of Statistics, Govt. of J & K.

Table 8.3

District-wise Distribution of Major Crops—Total Cropped Area 912.81 hectares
Area in thousand hectares - 1982-84.

District	Rice	Wheat	Maize	Pulses	Orchards & Vegetables
Anantnag	41.04 14.89%	...	22.02 7.98	3.45	7.03
Pulwama	30.17 10.95%	0.47 0.93%	11.21 4.06%	2.49	11.91
Srinagar	13.80 5.00%	0.07 0.03%	4.56 1.65%	0.52	5.98
Badgam	27.51 9.98%	2.37 1.14%	13.24 4.80%	2.36	5.34
Baramulla	35.52 12.89%	0.41 0.19%	21.84 10.45%	6.40	14.58
Kupwara	17.72 6.43%	0.01	20.21 7.32%	1.21	4.76
Leh	...	2.43 1.14%	...	0.36	0.31
Kargil	...	2.04 1.40	...	1.07	0.12
Jammu	54.37% 19.73%	90.33 42.46%	11.67 4.22%	11.77	2.16
Udhampur	11,98 4.35	33.14 15.51%	47.52 17.21%	5.36	0.28
Doda	3.90 1.42%	7.14 3.36%	40.91 14.82%	3.52	0.73
Kathua	28.69 10.41	41.18 19.36%	15.66 5.67%	6,99	0.33
Rajouri	6.78 2.46%	24.68 11.60%	31.28 13.86%	1.95	0.02
Poonch	4.13 1.50%	7.96 3.74%	21.96 7.95%	0,15	0.07
Total	215.61 100%	212.73 100%	276.07 100%	47.60	53.62

Source : Computed from the data, Digest of Statistics, J&K - 1983-84.

October. The High Yielding Varieties (HYV) of rice have been diffused in the areas where controlled irrigation by canals or tube-wells is available. In the *Kandi* areas wherever, soils are clayey, rice is grown as a rain - fed crop. The Valley of Kashmir is often been called as the 'Rice Bowl' of the State, while the Tehsil of Ranbirsinghpura (Jammu) is well known for its *Basmati*—rice.

On the low lands, the preparation of fields for rice cultivation is carried out under the dry and puddled system. The former involves repeated ploughings of fields. It is sown either by broadcast or transplanted. In transplantation, seedlings are raised in nurseries and after about forty days are transplanted in the paddy fields.

Though rice is grown in Jammu plains, *Kandi* lands, Udhampur, Bhadarwah region and the Jhelum plains, its major concentration lies in the districts of Jammu, Kupwara, Anantnag, Baramulla, Srinagar, Pulwama and Kathua.

The average yield of paddy varies from region to region and latitude to altitud. The average yield of rice in Kashmir Division is about 15 quintals per hectare while, in the Jammu Division the average yield per hectare is 13 quintals. In both the cases it is above the national average of 12 quintals per hectare. There are however, intra-regional variations in the yield pattern of rice For example, the yield of rice in Ranbirsinghpura is much higher to That of Udhampur and Bhadarwah Tehsils.

The total production of rice in the State was 5500 thousand quintals in 1983-84, out of which nearly 75 per cent was produced in the Kashmir Valley and only 25 per cent in the Jammu Division. The production of rice can be raised substantially, if High Yielding Varieties are diffused, especially in the areas with controlled supply of irrigation.

Wheat *(Triticum)*

Wheat is a staple crop which requires cool and moist weather conditions. At the time of sowing the night temperature should be about 15°C and it thrives well if the average temperature remains around 18°C. At the time of ripening the day temperature should be about 30°C. Wheat requires about 30 cm to 50 cm rainfall. At the failure of rains the crop needs to be irrigated repeatedly. Wheat is a *Rabi* crop in Jammu and Kashmir Divisions and *Kharif* crop in Ladakh Division. In Jammu and Kashmir it is sown, generally, in the month of November and harvested in April. In the Valley of Kashmir, it is sown in October and remains dormant under the low temperatures of winters. The crop shows rapid growth during springs as the temperature starts rising. Well drained loams and clayey loams are considered ideal for wheat cultivation. It requires a well pulverised but compact seed-bed for good germination. The fields are ploughed and pulverised several times before the seed is sown.

Wheat has been diffused in almost all the districts of the State, but its major concentration lies in Jammu (42%), Kathua (19%) Udhampur (16%), and Rajouri (11%). In rest of the districts, the temperature conditions are not conducive for its cultivation. It is interesting to note that wheat has also been diffused in the Leh and Kargil dist. of Ladakh Division. In Ladakh wheat is a Kharif (summer crop) sown in

May and harvested in August & September. On the whole, wheat occupies about 23 per cent of the total cropped area of the State.

Wheat cultivation is done in about 212,000 hectares out of which 204,000 acres are in the Jammu Division and only 3,000 in the Kashmir Valley. The Suru Valley of Kargil is coming up as the 'wheat boul' of Ladakh.

Maize *(Zea-Mays)*

Maize is the second important cereal crop of the State occupying nearly 30 per cent of the total cropped area. Maize requires hot and moist climate for its cultivation. The soil should be well drained in which water does not remain standing. During the period of its growth, maize requires several hoeings. At the failure of rains, the crop gives better results only if irrigation is made. The sandy-loam tracts of Jammu plains, the *Kandi* lands of the State and the *Karewas* (suitable for agriculture but not under Saffron or orchards) are generally devoted to maize.

Maize is not only used as a green fodder, it is a staple food for the people who live in the *Kandi* areas, especially the Gujjars of Jammu Division.

Nearly 273000 hectares (30%) out of the 913000 hectares of gross cropped area of the State in 1983-84 was under maize cultivation. Its areal distribution shows that the districts of Udhampur (47%), Doda (41%), Rajouri (38%), and Poonch (22%) are the leading maize producing districts of the Jammu Division, while in the Kashmir Division its main concentration lies in Baramulla (29%), Anantnag (22%) and Kupwara (20%) (Table 8.3).

The total production of maize in 1983-84 was approximately 3821 thousand quintals giving an average yield of about less than 2.5 quintals per acre. The low yield per acre may be attributed to the agro-climatic conditions and the non-availablility of High Yielding Variety Seeds of maize.

Among the other cereal and non-cereal crops grown in the State, *Bajra*, pulses (green-gram, black-gram, red-gram), barley, *grim* (a type of barley), millets, oil seeds and fodder are important.

Saffron *(Crocus Sativus)*

Saffron is one of the important cash crops of the Jammu and Kashmir State. Its cultivation is carried on in the *Karewas* of Kishtwar (Jammu Division) and Kashmir Valley. The cultivation of saffron is closely influenced by the prevailing temperatures, rains, snowfall, soil-texture, and the underground water-table.

Persistence of extreme cold and scorching heat are unfavourable where as temperate conditions with light snowing are considered to be conducive for saffron cultivation. Day temperatures above 25°C from April to August with occasional showers are required for a good crop. In October and November (flowering period of Saffron), the night temperatures should be close to the freezing point. Although the plant needs different temperarure and moisture conditions in the different parts of the years, long spells of rains and rainless intervals affeet the outturns of the crop adversely.

Saffron thrives well in a well-drained *Karewa* soil. The underground water-table should be more than 2.5 metres deep as the high water-table damages the croms of saffron. The lacustrine deposits (Karewas) composed of blue, grey and buff silt and sand intermixed with conglomerates and

terminal moraines are the ideal pedological conditions for the successful cultivation of saffron.

Apart from agro-climatic conditions, the cultivation of saffron also depends on the economic condition of the farmer. The seeds and labour costs are high and a poor farmer cannot afford these costly inputs. Moreover, in the first tow years there is no return from the saffron field, which makes the poor farmer shy in the adoption of its cultivation.

The various operations adopted in its cultivations may be summed up as under. At the advent of spring in April and May the field is repeatedly ploughed either by plough or twice by tractor, at an interval of about 20 days, Subsequently clodding, levelling and hoeing operations are done which continue till the middle of August. In September seed corms are planted in 15-20 cm wide furrows at a depth of about 8 cm. The field after sowing is divided into about 2 metres wids strips. On all sides of these strips about 15 cm deep and 30 cm wide drainage channels are made which resemble to a chess-board, The rectangular seed bed rides are made to drain out the water quickly.

The hoeing of saffron field is done in June and August, which is repeated every year till the corm reproduction over conjust the soil after which the field is dishoarded for being prepared for a fresh sowing.

Saffron corp is harvested in the later parts of October and the early parts of November. During this period picking of saffron flowees just after the disappearance of due is imperative to obtain good fragrance. From the flowers stigmas are removed and classified into *Shahi*, *Mongra*, and *Lachha* categories of saffron. Initially, saffron cultivation was confined to the Pampore-Karewa, but now it has been diffused in the various parts of the Valley. Its cultivation is being carried on in the fourteen tehsils of five districts of the Kashmir Divlsion. It has been diffused in 184 villages i. e. 6.25 per cent of the total villages of the Kashmir Division. Pulwama Tehsil with 73 per cent of the total saffron area has the largest concentration, whilc the remaining thirteen tehsils share 27 per cent of the total saffron area. There are still many unutilized *Karewas* in which saffron can be diffused, provided extension service and subsidy to the farmers are given.

Horticulture

Horticulture is a type of agriculture in which generally garden crops e.g. fruits, flowers and vegetables are grown. The word is derived from the Latin word Hortus=garden, and Colere=cultivate. The concept of garden culture as a distinct from of field culture dated back to the Medieval farming system that used extensive areas for grains, forage, fodder and pastures.

Horticulture is traditionally divided into (i) pomology, e. g. food crops, nuts, vines, and (ii) floriculture e. g. edible-roots, edible-stems, edible-leaf, edible-seeds and flowers. The State of Jammu and Kashmir has great diversity in the geo-ecological conditions which ideally suit for the cultivation of almost all kinds of temperate and some varieties of tropical and sub-tropicol fruits.

15. Saffron-beds—Valley of Kashmir.

16. Picking of Flowers of Saffron—A Pleasant Hobby.

Horticulture is an old economic activity in the State of Jammu and Kashmir. Kalhana, the great Kashmiri historian mentioned fruit culture in Kashmir in his famous book 'Rajtarangini' during the reign of King Nara as back as 1000 B. C. It was however, during the period of Lalitaditya (900 A. D.) that horticulture in the State received considerable patronage. Subsequently, during the periods of Zainul-Abidin and the Mughals some varieties of fruits were brought from Kabul, Persia Iran and Central Asia.

At present about 810, 009 hectares are under orchards in the State. The districtwise distribution of area under orchards has been given in Table 8. 4.

An examination of Table 8.4 reveals that fruits, nuts and vegetable are grown in substantial acreage in each of the districts of the State. Orchards however, have high concentration in Jammu (17.34%) Baramulla (11.3%), Anantnag, Udhampur and Kathua Districts.

The Valley of Kashmir, parts of Doda, Kathua, Udhampur, Rajouri and Poonch district fall in temperate zone which is conducive for the cultivation of temperate fruits and nuts. These districts have high acreage under apples, cherry, peach, *Nakh*, plum, grapes, pomgranats, apricot, pears, almod, walnut and chestnut.

Most of the apple orchards lie between 1800 and 2750 metres. The sandy soil is not suited to the cultivation of apple orchards as they induce root-bores attack and pink disease. Deep and heavy loams are more suitable for orchards which can retain

Table 8.4

Districtwise Distribution of Orchards in 1983-84
Total area 810,009 hectares

District	Area in hectares	Percentage
1. Srinagar	28,396	3.50
2. Badgam	25,332	6.83
3. Anantnag	76.504	9.44
4. Pulwama	64.151	7.91
5. Baramulla	92.581	11.30
6. Kupwara	45.925	5.66
7. Leh	9.872	1.21
8. Kargil	8.630	1.06
9. Jammu	140.480	17.34
10. Udhampur	74.134	9.15
11. Kathua	72.922	9 00
12. Doda	64.686	7 98
13. Rajouri	50.618	6 24
14. Poonch	26.778	3.38

Source : Digest of Statistics, 1983-84, J & K State

moisture for a longer period. Some of the important varieties of apple grown in the Valley of Kashmir are Ambri, American-terl, Delicious, Maharaji, Hazratbali, Kesari, and Royal Misri. The districts of Baramulla, Anantnag and Srinagar have over 80 per cent of the total apple orchards of the State.

Pears (*Nakh*) and peach also grow well in the cool and humid climate of the Kashmir Valley. Peach is however, highly perishable and farmers are not much inclinder in the expansion of its orchards. Pears and peach orchards are well scattered in the different districts of Kashmir Division.

Apricot (*Khoobani*) fruit requires humid nights, and cool weather during the early parts of its growing period and moderately high (25°C) temperature during later parts of development. Leh and Kargil districts of Ladakh and the hilly areas of Kashmir below 3000 metre are suited for apricot orchards.

In the Jammu Division sub-tropical fruits e. g. mangoes. oranges, maltas, *Ber*, Plum, papaya, guava, peach, *Litchi*, lemon and grapes are grown. About 500 varieties of mango, each with a particular taste and flavour are found in the State, especially in the Jammu Division. However, only a few of these are of commercial importance. The crop takes about 4 months (March-June) to mature.

In 1982-83 there were 2.5 crore fruit trees in the State. At present several new projects have been launched to spread orchards in the State. Incentives have been offered by the various departments of the State to develop orchards in drought prone *Kandi* and hilly areas. Fifty per cent subsidy on plant material is being provided to the growers of the State. Consequently, more than 5,050 acres have been covered under this scheme. For a steady expansion of horticulture, the grower must provide precise inputs and be vigilent against pests and disease. In fact, exact scheduling is imperative since most of the fruits and flower crops are highly perishable. Transportation to market must function smoothly to avoid losses.

Area of fruits like apples, walnut, *Litchi*, pear, cherries and apricot have increased since 1980, while the area of almond, *Lauqat*, and peaches is shrinking.

From the State neary 3.75 lakh tonnes of fruits are exported annually. Besides, Delhi, Bombay, Madras, Hyderabad and Banglore, the fruits (fresh and dry) and nuts are exported to the various towns and cities of Punjab, Haryana, Uttar Pradesh, Bihar, Madhya Pradesh, Rajasthan, and Andhra Pradesh.

One of the main hindrances in the development and expansion of orchards is the marketing of fruits. The packing and transportation costs are substantially high and the orchard farming is facing a tough competition from other states. Moreover, the packing of fruits in woodden boxes is consuming enormous quantities of soft and superior timber. These problems may be overcome if fruit canning industries could be established at suitable places in the state.

Sericulture

The rearing of silk worms on mulberry trees for the production of raw-silk is known as sericulture. In the State, mulberry trees

in the wild form existed from antiquity. In Kashmiri language the silk-fibre is known as '*Pote*' and the silk- worm is the Patikeom (insects). *Pote* manufacturing in the Valley is an old industry. Sericulture involves the stages, of :

(i) Rearing of silk worm;
(ii) Collection of cocoons and their delivery for reeling purpose;
(iii) Reeling of raw silk from the cocoons; and
(iv) Availability of mulberry trees from which fresh leaves (the feed of silk worms) can be obtained.

Rearing of silk worm requires scientific knowledge technical skill. For the development of healthy silk worm two basic seed stations have been established at Udhampur and Miragund. Work on the Qazigund Nursery is also under progress. There are 2,800 villages and 33,000 households in which sericulture has become an important economic activity. Out of these 1500 villages are situated in the Kashmir Division and the remaining 1300 villages in the Jammu Division. The areal sprawl and production pattern in the State has been given in Table 8.5.

In the State there are about 6.37 lakh mulberry trees, out of which 53 per cent (3,35,000) are in Jammu Division and 47 per cent in Kashmir Division. Annually about 6,680 quintals of raw silk is produced which is approximately equivalent to Rs. 2.34 crores.

Inadequacy of mulberry leaves and damage caused by insects and pests are the major problems in the development and expansion of mulberry trees. Now the Sericulture Development Department is laying stress on raising dwarf mulberry trees to supplement and replenish the traditional tall mulberry trees. As a result of these efforts the dwarf varieties have increased substan-

Table 8.5

Sericulture in Jammu & Kashmir State - 1983-84

	Kashmir Division		*Jammu Division*		
	No/ Quantity	Per cent	No/ Quantity	Per cent	Total
1. Mulberry trees	302000	47.41	335000	52.59	637000
2. No. of Sericulture villages.	15000	53.57	13000	46.42	28000
3. No. of Sericulture house holds	12300	37.27	20700	62.73	33000
4. Production of cocoons	4430	66.32	2250	33.68	6680 qtls.
5. Production of raw silk in quantity.	35800	82.36	7670	17.64	43470 qtls.
in value of lakh Rs.	182010	77.85	51800	22.15	233810

Source : Digest of Statistics, J & K, Srinagar.

tially in the State. At present there are 208 mulberry farms, 21 nurseries and 545 incubation centres.

The temporal increase in the acreage of dwarf mulberry trees is given in Table 8.6.

An analysis of Table 8.6 shows that in 1974-75 the dwarf variety of mulberry tree was spread in only 31 acres. Between 1975 and 1978 there had been adequate stress on dwarf varieties. Consequently, the area has increased to 291 acres in 1978-79 and 350 acres in 1983-84. The climate and skilled labour of the Valley of Kashmir put the State in advantageous position for the spread of sericulture and silk industry. New, sturdy hybrid species of silkworm need to be developed which can withstand the adverse climatic conditions and can give increased yields and better quality of cocoons.

Floating Gardens (Radh)

Cultivaton of vegetables in and around the Dal Lake is a peculiar feature of the agricultural systems of Kashmir. The *Demb* fields and *Radh* (floating fields) are the main suppliers of vegetables to the city of Srinagar.

Radh (floating gardens) are made of reeds in the form of strips. These strips are generally made about 2 metres wide and 100 metres long each. Two or more than two strips are tied with ropes to make a long *Radh* which may be one to two hundred metres in length. These strips can be towed from place to place and moored at the four corners by wooden poles driven into the lake bed.

When the *Radh* is made strong to bear the weight of a man, heaps of weed and mud are extracted from the lake by poles and indigenous tools. These heaps are formed into cones (*Pokar*) and placed at the *Radh* (floating field) at an interval of about two metres, Simultaneously in the month of April seeds are sown by the growers in their houses to grow seedlings. In the middle of May these seedlings of vegetables are transplanted in the *Pokar* (earthen and weed cone). The vegetable plants grow rapidly in the fertile and moist soil of the *Pokar* uhder the intense temperature of the period. The cool breeze provide enough moisture to the *Pokar* soil and irrigation to the crop is not required. In the floating fields, vegetables like tomatoes cucumber, melon, and water-melon are generally grown, These crops are harvested from July to September.

Demb-Land

The Demb Hanj or vegetable growers have reclaimed land from the shallow waters of Dal, Nagin and Wular lakes. For the deve-

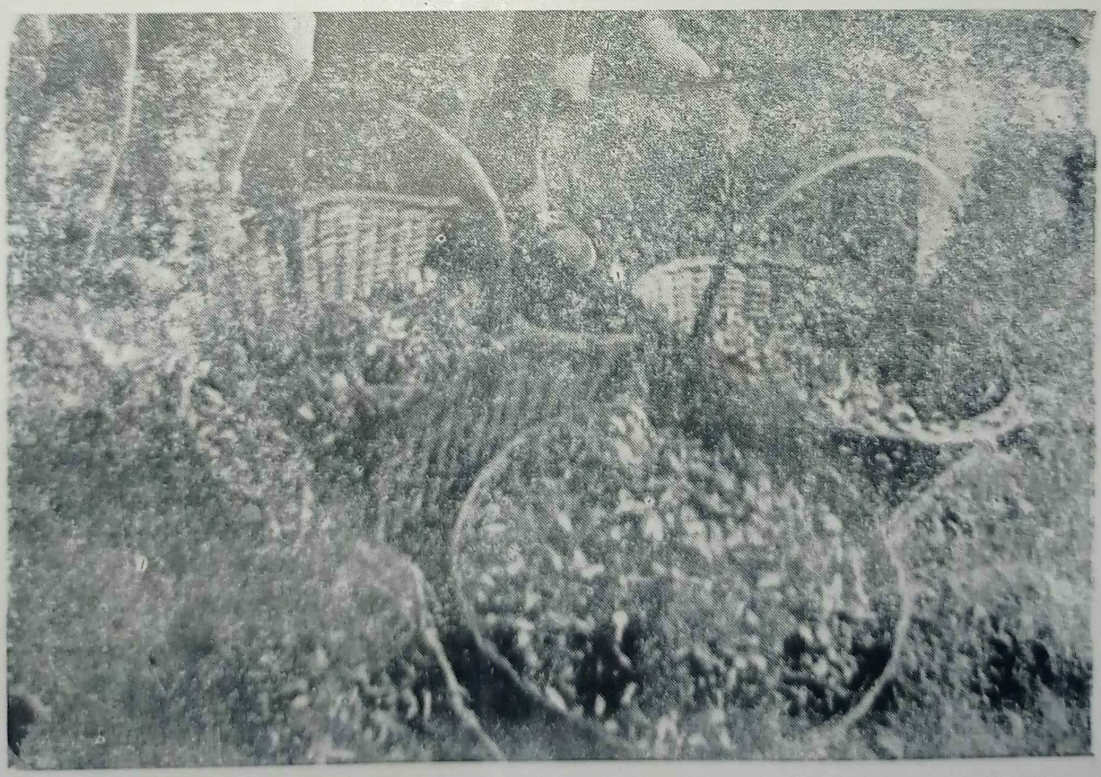
Table 8.6

Area Under Dwarf Mulberry Trees - 1984-85

Year	Area in acres dwarf mulberry trees	Percentage increase
1974-75	31	838.70
1978-79	291	20.27
1983-84	350	—

Source : Digest of Statistics. J & K Govt.

17. Saffron flower with Stigmas.



18. Harvested Saffron Flowers.

lopment of a *Demb*-field, a vegetable grower, selects a shallow water suitable site near the bank of the lake and plants willow or poplar trees along its all sides, Inside these willow and poplar trees he casts boat-loads of weed and mud until his land emerges above the level of the water and year after year he adds a new dressing of rich soil and weed obtained from the water of the lake. The two *Demb*-fields are generally separated from each other by a water-channel which helps in providing water and moisture to the crops. Through these water-channels, small boats are moved from one field to another.

The main crops grown in the *Demb*-fields are *Haak* (Spinach), pumpkins, gourd, melon, tomatoes, turnip, carrot, reddish, onion, chillies, letuce, egg - plant, white-beans, maize and rape-seeds.

The *Radh* and *Demb* fields are undoubtedly providing fresh vegetables to thc urban population of the Valley, but they are polluting the water and accelerating the rate of silting of the lakes, which my ultemately convert the beautiful lakes like Dal and Nagin into a flat fertile tract.

Livestock

Livestock rearing is an important economic pursuit in the rural parts of the State. The cool climate, the alpine pastures, the perennial streams and demand for milk and milk products, all favour the keeping of cattle in Jammu and Kashmir State. Cattle, sheep, goats, horses and ponies are reared in large quantities mainly by the rural dwellers of the State. The number of cattle according to the statistics of 1983-84 were as given in Table 8.7.

An examination of Table 8.7 shows that the total population of cattle in the State in 1982 was 59.56 lakhs, out of which 39 per ccnt were cattle and 32 per cent sheep. The percentege of goats was about 17 while buffaloes constituted 9 per cent of the total cattle population, and horses and ponies share was only 2 per cent in the total cattle population (Fig. 15). The dominance of cattle population is found in Udhampur, Doda, Kutha, Anantnag, Baramulla, Pulwama and Rajouri districts. Most of the stock, however, is local and inferior in quality. The State Goverment is taking various

Table 8.7

Jammu and Kashmir State—Animal Husbandry - 1983

Livestock	Number in lakh	Percentage
1. Cattle (cows)	23.25	39.03
2. Sheep	19.09	32.05
3. Goats	10.04	16.86
4. Buffaloes	5.63	9.45
5. Horses, ponies etc.	1.31	2.20
Total	59.56	100.00

Sou : Livestock Census

step to improve the quality of cattle, sheep and goats and sveeral such farms have been established in the different parts of the State. Some of the important cattle breeding farms are :

(i) Cattle Breeding Farm Chashma-Shahi-Manasbal, Srinagar,
(ii) Cattle Breeding Farm Belicharna, Jammu,
(iii) Cattle Breeding Farm Changspa,
(iv) Cattle cum Karakul Sheep Farm Khumbathang,
(v) Yak Breeding Farm Nobra and
(vi) Veterinary Hospital Drass.

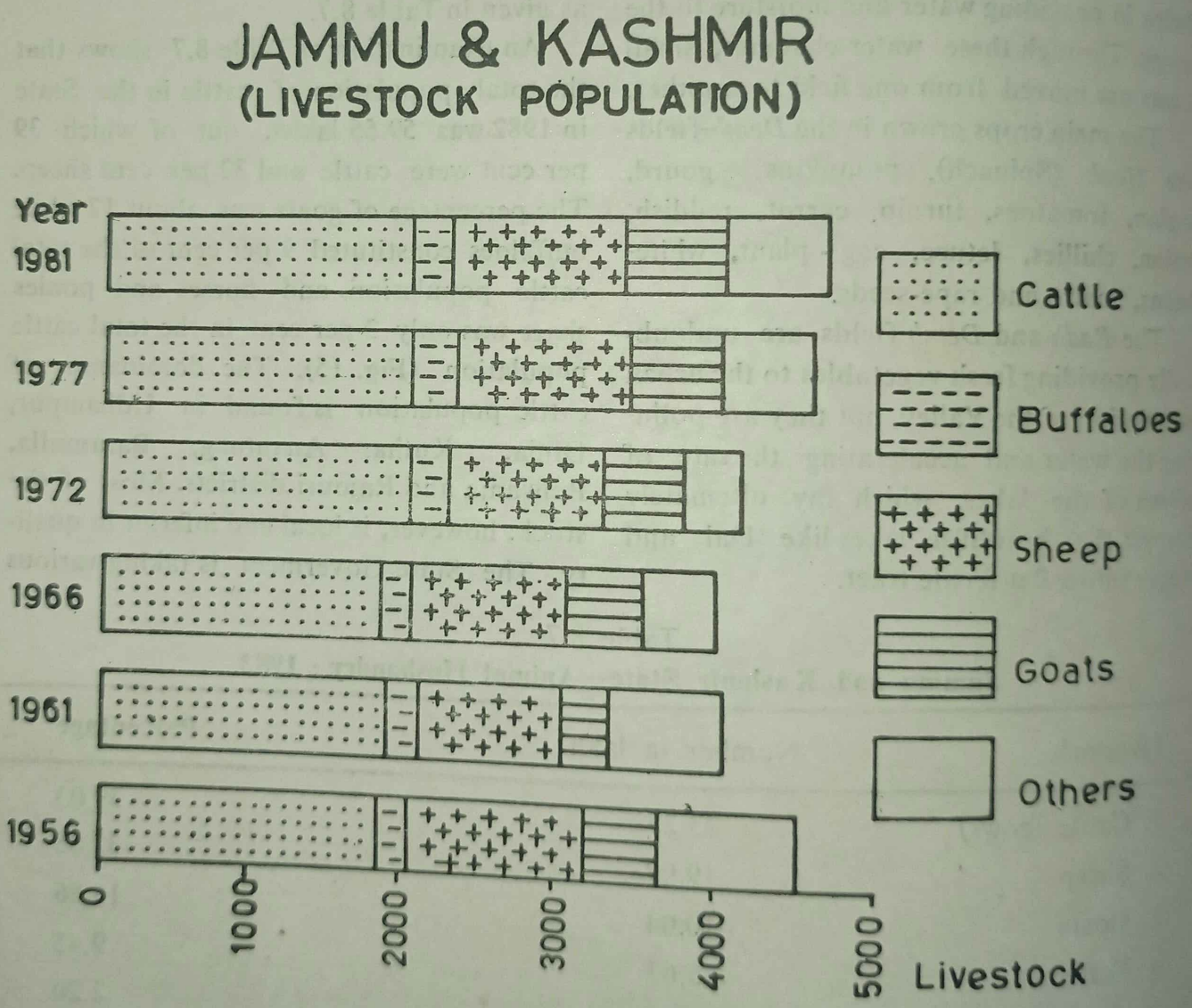


Fig. 15

Apiculture

Apiculture is also known as bee-keeping. In bee-keeping, bee colonies are maintained for the commercial production of honey and other bee products. Bee keeping also helps in cross pollination of crops. Honey produced by honey-bees has been considered as a balanced, delicious food for thousands of years and the honey bee is amongst the most ancient of domestic animals.

The Valley of Kashmir is well known for its great diversity of flowers ranging from lily to saffron. Most flowers are dependent upon bees for carrying pollen from the anthers (male part) of one flower to the stigmas (female part) of the flower. Many fruit trees like almond, cherry, pears pumpkin, sunflower will not produce fruit unless bees are present to pollinate them.

In the Valley of Kashmir bee keeping is a household industry in Pampore, Srinagar Pulwama, Tral, Kulgam, Badgam, Islamabad, Qazigund and Karnah. In Jammu Division bee keeping is being developed in Udhampur, Poonch, Kishtwar, Bhadarwah and Batote.

Problems of Agriculture

Agriculture as discussed at the outset provides employment to over 70 per cent of working population in the State. It also provides raw materials for a number of agro-based industries. But the agricultural sector is not developing at the desired level of development. Some of the reasons for the stunted growth of agriculture are :

(1) The average size of holding is small. About 50 per cent of the holdings, especially in the Jammu and Jhelum plains are less than one hectare which do not yield enough income for purchase of irrigation water, fertilizers, pesticides and new technology.

(2) In the *Kandi* areas and parts of *Karewas* irrigation is not possible owing to undulating terrain and non-availability of underground water-table. Contrary to this the poor maintenance of Zamindari Canals (*Kuls*) in the Valley of Kashmir is damaging the chemical and textural properties of the fertile soils.

(3) Soil erosion is a serious menace in the *Kandi* tracts, while unscientific rotation of crops in the plain parts are depleting the soils . In Jammu, it has been found that rice crop is followed by wheat crop in a field. Both the crops are soil exhaustive which deplete the soil fertility at a much faster rate. Moreover, the fallowing of fertile fields in Jammu is not done owing to meet the food requirements of the people. Green manurig crops cannot be rasied for the same reason. The chemical fertilizers which can help in the maintenance of soil fertility are expensive and beyond the means of small cultivators. Efforts, thtrefore, need to be made to increase the use of rural compost, urban compost and sewage manures.

(4) The implements of most of the cultivators, especially in the paddy and maize growing villages of Kashmir are obsolete which were designed during the last century and inadequate to carry out agricultural operations effectively. The wooden plough and pulveriser are still most commonly used. New tools and implements should be provided to the farmers at subsidised rates.

(5) Plant protection in the entire state in general and in the High Yieldding Varieties growing areas in particular should be provided for which cheap insecticides and extension service can go a long way in overcoming the problem.

(6) Agricultural marketing is another problem which the orchard and saffron growers are particularly facing. There is long distance between the apple orchards of the Valley and the markets of the Great Plains of India in which fruits are sold. The transportation cost make the fruits of the Valley more expensive as a result of which it is becoming difficult to compete with the apples of Himachal Pradesh and Uttar Pradesh (Tehri, Garhwal, Kumaon).

To overcome these problems, concrete steps have to be taken. The main problems of the *Kandi* lands and plain areas have to be indentified systematically before any integrated plan is designed.

REFERENCES :

1. N. P. K. Aiyer, 1986 '*Field Crops of India*, Banglore.
2. M. Husain, 1979, *Agricultural Geography*, New Delhi.
3. Govt. of India, *Indian Agricutulral Statistics*, New Delhi.
4. Indian Council of Agricultural Research. *Handbook of Agriculture*, New Delhi, 1970.
5. Govt. of J & K , 1984, *Digest of Statistics*, Srinagar.
6. G. M. Mir, *Saffron Cultivation in Kashmir*, unpublished thesis, Univ. of Kashmir, Srinagar.

CHAPTER – IX

Industries

The industral development of a region largely depends on the availability of mineral, power and human resources. In the location of a modern industry the importance of raw materials (minerals, forest-products, fibres, chemicals), and energy resources is so fundamental that it need no emphasising. The site of a industry is also influencd by the climatic conditions, availability of water, capital, market, skilled labour, industrial inertia, historical accident and government poilcy.

The State of Jammu and Kashmir, though rich in water and forest, is not fortunate in respect of basic mineral and power resources . The non-availability of iron ore, coal, petroleum, the remarkable growth of human population and the geo-political conditions have put great constraints in the development of industries in the State. Nevertheless, the Kashmiris have an age old tradition in the manufacturing of carpets, silk textiles, shawls, raffle, wood-work and handicrafts. In the rural areas leather industry, village oil industry, village cereal products, pottery, blacksmithery, carpentry, bee-keeping, papier-mache willow-wicker, soap, food-preservation and cottage are some of the village industries which provide full or part-time employment to the people. Some of the important industries of the State have been described in the present chapter.

Silk Textile

The art of silk making has been practised in the State since ancient times. Kashmir arts and crafts are renowned the world over for their charm of colour and shades. Silk fabrics were exported from Kashmir to Persian (Iran), Greek's and Roman Empires. During the medieval period the Mughals were the great lovers of silken cloths and they patronised this industry in the Valley.

At present silk industry and its allied activities provide employment to about 2.45 lakh people and contributes about two crores to the income of the State. It also helps in the building of a concrete base for the village and small scale industries (e.g. shawl, carpet, *Gabba*, *Namda*, hoisery, embroidery ete.). Moreover, it utilizes the barren and less productive tracts for the cultivation of mulberry trees. The workers engaged in the various activities of silk textile in the State are given in Table 9.1.

Table 9.1

Employment in Silk Industry

Employment	Number	Percentage of Total workers
1. Silk factories	930	0.38
2. Weaving factories	2000	0.81
3. Mulberry culture	425	0.17
4. Staff	700	0.29
Seasonal Workers		
5. Grainage	800	0.33
6. Silk worm rearing	240,000	98.02
Total	244,755	100.00

Source : Govt. of J & K Digest of Statistics 1984

An examination of Table 9.1 shows that silk textile provides permanent and seasonal employment to about 2.45 lakh workers. Over 58 per cent of the workers are, however, busy in silkworm rearing and grainage. There are only 4055 workers who work permanently in silk textile.

The silk factory at present consists of several sectors and it is dependent on various units. The basic units comprise of (i) farmers, rearing silk-worms and production of cocoons, (ii) the second unit is the manufacturing of silk fibre and cloth. There are two silk factories in the State, situated at Rambagh (Srinagar) and Jammu; (iii) the third unit is the Department of sericulture development which produces improved varieties of silk worms and takes care of mulberry trees.

The Rambagh silk factory was established in May 1897 by Raja Ranbir Singh under the guidance of Malton. The annual production data of the Rambagh Silk Factory is given in Table 9.2.

Table 9.2

Silk Production—Rambagh Factory

Year	Production of Raw Silk in kg.
1974-75	50,792
1976-77	44,280
1978-79	57,183
1980-81	57,850
1982-83	37,361
1984-85	42,796

Source : Data obtained from the Silk Factory Rambagh.

The Rambagh Silk Factory produces annually about 47 thousand kg. of raw silk. The silk production, however, fluctuates between 37 to 57 thousand kg. In 1680-81 for example, there was a record production of 57. 85 kg. silk which slumpped to only 37. 36 kg. in 1982-83. The production of silk largely depends on the availability of mulberry leaves which constitute the main feed [illegible] orms.

There are various categories of workers in the Rambagh Factory performing different activities. Table 9.3 shows the number and percentage of workers who are engaged in various activities of raw silk production in Rambagh Silk Factory.

Table 9.3

Rambagh Silk Factory—Silk Workers—1984

Type of Worker	No.	Percent to the total workers
1. Spinners	322	34.22
2. Cooks	170	18.20
3. Knotters	35	3.80
4. Silk Cleaners	54	5.90
5. Waste Cleaners	51	5.48
6. Rewinders	44	4.80
7. Store-keepers	222	23.90
8. Others	32	3.40
Total	890	100.00

Source : Silk Factory Rambagh, Srinagar.

Most of the workers (82%) are busy in spinning, store-keeping and cooking while silk cleaners, knotters, waste cleaners and rewinders constitute about 81 per cent of the total work force (Table 9.3).

Sericulture, despite favourable agro-climatic conditions has not grown at the desirable rate. Apart from the vigories of weather, competition from artificial silk is posing serious problems for silk industry as the artificial fibre is cheaper than the pure silk fibre. Other problems include low productivity and inferior quality of cocoons, high cost of production, absence of organised marketing agency and the stagnency of demand.

Carpet Making and Woollen Textile

Carpet making is an important industry of the State. Kashmiri carpets have been appreciated in and outside of the country throughout the history. Its major concentration lies in and around the city of Srinagar.

In Kashmiri carpets, the wrap is drawn in cotton, while the weave and texture leaving a fluffy pile is done by wool, silk and synthetic fibres. The number of knots in a given unit determines the quality and value of carpet, together with the quality of yarn, dyestuff and the finish, Kashmiri *Qaleens* (carpets) are manufactured by the Government undertakings as well as by the private establishments. Some of the important carpet maunfacturing centres in Srinagar are, the Cottage Industry, Exposition, C.A.E. Carpet Factory, Kashmiri Carpet Factory, G. O. Carpet Factory, The Indo-Kashmiri Carpet Factory, The Farghan Carpet Factory, The East India Carpet Factory, The Oriental Carpet Factory and the John Carpet Factory.

In most of these factories, children from poor families work. These workers get inadequate nutrition, and work under unheigenic conditions, consequently, their health, efficinency and education are adversely affected. About 75 per cent of the total carpet producdtion is exported to the countries of Middle-east and North-west Europe (U. K., France, Holland, Denmark, W. Germany, Belgium), which provide exchange over one million dollar annually.

Carpet making has many allied and ancillary crafts. *Namda* and *Gabba* are especial types of woollen carpets, used by the Kashmiris in winters. *Namda* is a type

of felt made of raw wool and cotton mixed in various proportions according to its grade and quality. The average size of *Namda* is 1 metre x 1.5 metres. Srinagar city is the main centre of *Namda* manufacturing. *Gabba* is relatively large in srze, being 1.75x2.50 metres in dimensions. *Gabba* is made of coarse wool in black, red yellow and green colours combinations. The *Gabbas* of Islamabad (Anantnag) are famous all over the country.

Apart from carpet making, there are two woollen textile factories one each at Karannagar and Bemina in the city of Srinagar. The wool textile of Naushehra (Srinagar) produces raffle utilized mainly for shawl making, woollen hoisery goods are produced in Jammu city. About 900 workers are engaged in the woollen textile whiche fetches about over Rs. 2 crores annually.

Forest Based Industries

Jammu and Kashmir State has over 30 per cent of its total area under forests (Chapter 3). Most of the forests consist of conifers which proved soft, valuable wood. These forests, if utilized properly can sustain a number of industries. Paper, pulp, match, sports goods, furniture, joinery, toys making are a few industries which can be developed in the *Kandi* and rural areas of the State.

Although a number of Joinery mills have been established in Srinagar, especially along the Srinagar-Baramulla Road, Pampore, Jammu, and sports goods are being manufactured at Miransahib (Jammu), in the villages of Anantnag District, yet planned efforts have to be made to develop forest based industries in the State. The willow' mulberry and walnut trees can provide the raw-materials required for the develepment of sports goods, furniture and wood artifacts. About two thousand workers earn their livelihood from forest based industries, and their annual production is worth Rs. 2 crores.

Forests also provide turpentine and a variety of resins, used in many industries. Resin is collected from the pine trees of Jummu and Kashmir Divisions. It has diversified properties. Lac obtained from the forests can be utilized in the manufacturing of polish, gramophone - records, adhesives, printing ink etc. There are resin manufacturing centers at Miransahib, Sunderbani, and Rajouri. These three factories employ 325 workers and produce resin worth Rs. 4 lakhs.

Agro-based Industries

The State of Jammu and Kashmir is primarily agricultural. In fact, agricultural products not only yield over 55 per cent of the State income but also provide raw materials to a number of industries. Fruit-canning, edible-oils derive raw materials from agriculture.

The Jammu Division and Kashmir-Valley produce large quantities of paddy. Over 60 per cent of the total population of the state is rice eater. The husk of paddy is removed in rice mills before it is marketed as rice. There are several large and small sized rice mills in the State. Barbarshah (Srinagar) has a large rice mill, but a modern rice plant has been established recently (1981) at Laitpore (near Pampore). The rice husk and rice bran are used as fuel a[illegible] feed respectively. Bran is

also used for the extraction of fatty-oil which finds application in soap industry.

The Valley of Kashmir has large tracts under apple, almond, walnut, cherry, peach and pear orchards. Transportation of these perishable fruits to the distant markets by road is quite expensive. The processing of fruits and making of jam, jelley, juice etc. are some of the industries which have enormous potentials especially in the districts of Baramulla and Anantnag. The Food Corporation of India (FCI) has to take initiative in this direction. Some fruit-based industries are however, coming up in the Valley of Kashmir.

Cement Industry

The raw materials for the manufacturing of cement are calcareous and argillaceous materials. These are mixed in suitable proportions to form the raw mix. Limestone, gypsum, coal, bauxite and clay are the main ingredients of this industry. Limeston and gypsum are available in large quantitics in the Baramulla and Anantnag Districts

The Wuyan Cement Factory was established in 1962 in which the raw materials obtained frcm Uri and Baramulla are used. This factory provides employment to about 200 workers and produces annually about 200 tonnes of cement per day. Recently (1982) a large cement factory has been set up at Khrew, known as the J & K Cements Ltd. Khrew. There are 500 workers employed in this Factory producing about 600 tonnes of cement a day.

There are several chemicals manufacturing units, tile - factory (Pampore), lignite briquetting plant (Shalateng), g[illegible]aking and electric goods manufacturing units in the State.

In the Public Sector, a H.M.T. Watch Factory has been established at Zainakot. It provides employment to about 1300 workers and produces about 4.50 lakhs watches annually, equivalent to Rs. 9 crores.

At Hyderpora (Srinagar), the Indian Telephone Industries have been established. It is a branch of the Indian Telephone Industry, Banglore, which produces telephone parts and accessories. It is a small unit in which only 150 workers find employment and telephone parts worth Rs. 1.20 crores are produced annually.

Industrial Complexes

The State Government in recent years has been paying attention towards the development of light and agro-based industries. The State Industrial Development Corporation has established industrial complexes at Rangreth, Khunmoh and Doabgah in Kashmir and at Bari-Brahmanan in Jammu.

The Rangreth factory assembles television sets. radios, transistors, electronic clocks, stabilizers, electric blankets, tape recorders and jewels for watches. Joinery articles, matches, automobile batteries and tiles are manufactured at Khonamoh. Bari-Brahmanan has become an important industrial complex of Jammu, producing detergents, resin-products, vanaspati, steel-rolling, scooters, textiles, sun-mica, paper, pistons, hoisery, electric-goods, light machines, rubber and plastic goods, chemicals, drugs, paper, printing, transport goods etc.

There are assorted village industries in the State. Leather processing, shoe making, oil pressing, pottery, black-smithry,

carpentry, bee-keeping, basket making, soap making, fruit preservation etc. are the main industry in which the rural population is finding employment.

The State of Jammu and Kashmir which has not seen much of industrial growth due to lack of basic minerals and infrastructures has started showing the signs of industrialization. The development of new power projects, wide-spread of roads-network and coming up of the state on the railway map of the country have helped appreciably in creating an atmosphere conducive for the growth and development of industries. A number of industrial areas have been set up and various steps are being taken to help the development of industries. The number of registered factories has gone upto 670 and about 1500 are small scale industries. Concerted efforts need to be made failure to which the industrial sector of the state may show stunted growth.

Tourism

Tourism is a pastime of journeying from home to some other place, near or far. It has become a big business and been included in the category of industry. The money spent on tourism constitutes the largest single item in the world trade. The main elements of Tourism are transportation by air, sea and land; food, services, accommodations and entertainment for visitors; and the manufacture and sale of thousands of items of souvenirs, artifacts, and special goods.

The growth of population's material well-being, manifests itself in significant increase in income, leading to more material goods, and consequently, the greater demands. As the people's cultural level rises, so do expectations of the level of comfort in leisure activities. This is accompanied by a tangible increase in the population's mobility and a greater diversification of recreational services. Thus as the economy of the country develops that provides the people more opportunities to see the various parts of the country.

The State of Jammu and Kashmir has beautiful valleys, shimmering lakes, snow-capped peaks, invograting climate, opportunities of trekking, fishing, skiing, and numerous, archeological, historical, cultural and religious places. All the three Divisions of the State (Jammu, Kashmir, Ladakh) have their peculiarities which attract the tourist from all over the world. The Valley of Kashmir, described by the Mughal Rulers as 'Paradise on Earth' has great magnetic pull for the national and international tourists. The Vaishno-Devi and ancient temples attract the Hindus in larger number. while the Buddhist culture and *Gumpas* of Ladakh are visited especially by thousands of Indian and non-Indian tourists.

Tourism is an important economic activity in the State. It generates employment for over several lakhs of people and fetches about 17 per cent of the State income. The State Government provided about 55 crores in the 6th Five Year Plan for the development of infrastructure, to improve the means of transportation and communications, beautification of gardens and construction of tourist centres, dormitories, *Sarais* and hotels.

The tourists who visit the State may be classified into (i) tourists from India, and (ii) [illegible] from the outside of India. Ex[illegible] ourists who visit Vaish[illegible]-

Devi and religious places of Jammu, most of the Indian tourists come to the Valley of Kashmir and their visits are generally confined during the summer months i.e. May to October. In fact, the months of September and October in which the holidays of Durga Puja, Dushehra and Diwali, fall, provide a good opportunity for the tourists to enjoy their leisure time in the invagorating climate of Kashmir. Contraty to this, the foreigners, mostly come in Kashmir from August to January as this is the period when trekking and skiing are highly enjoyable, Srinagar, Pahalgam, Gulmarg, Sonmarg, Aru, Chandanwari, Aharbal, Pattan, Mattan, Verinag, Achhabal, Kokarnag, Dakusum, Prang, Harvan are some of the important tourist places in Kashmir Division.

The temporal growth in the number of tourists has been diagramatically shown in Fig. 16 and their statistics have been given in Table 9.4.

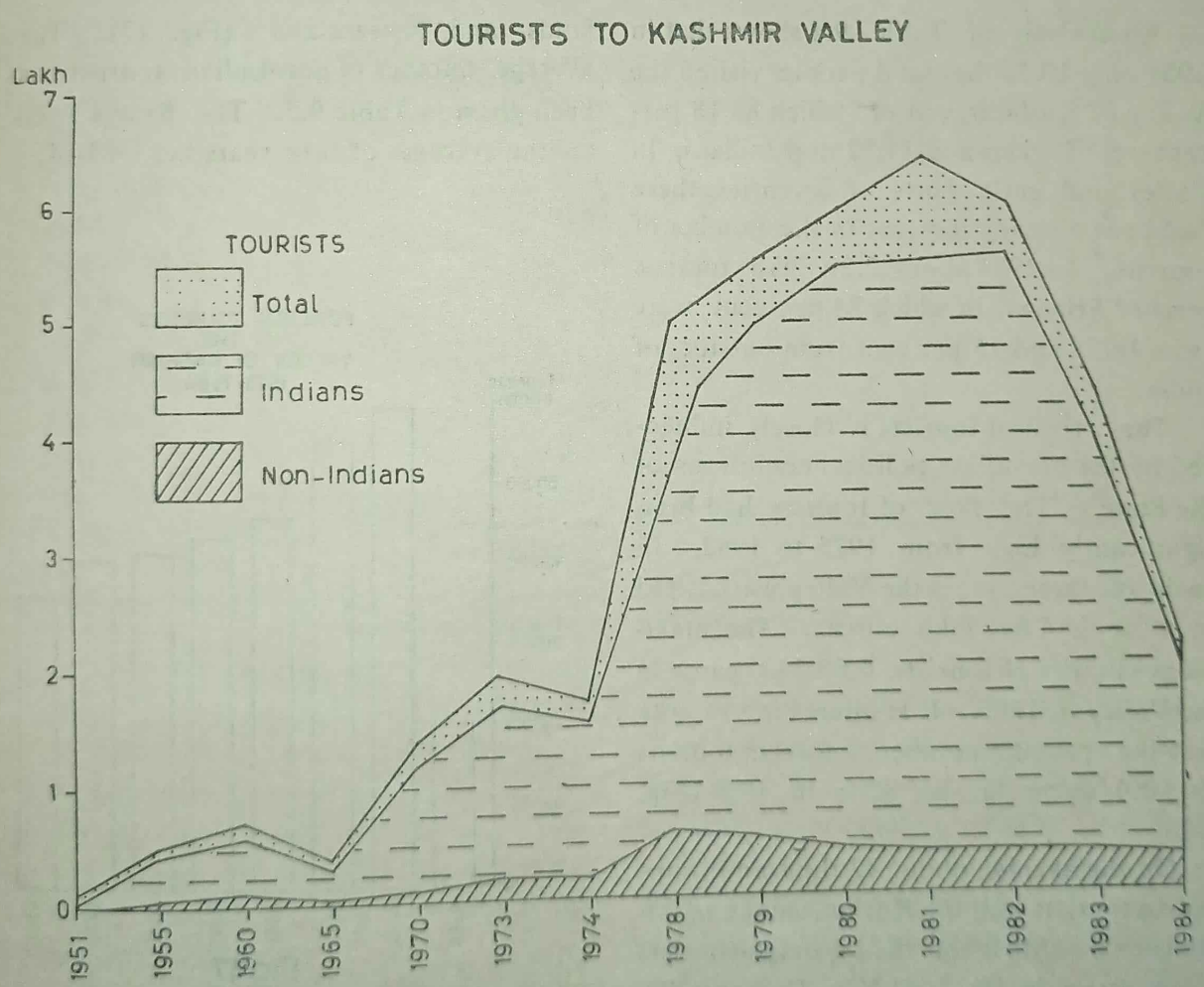


Fig. 16

Table 9.4

Tourists Coming to the Valley of Kashmir in Thousand

Year	Indians	Non-Indians	Total
1951	9.33(88.18%)	1.25(11.82%)	10.85
1964	35.70(82.77%)	7.43(17.23%)	43.13
1974	148.32(88.49%)	19.30(11.51%)	167.62
1984	192.68(84.08%)	36.46(15.92%)	229.14

Source : Directorate of Tourism, 1985

An analysis of Table 9.4 shows that in 1951 only 10.58 thousand people visited the Valley of Kashmir, out of which 88.18 per-cent were Indians and 11.82 non-Indians. In sixties and early parts of seventies, there had been a steady increase in the number of tourists. In 1984 about 2.29 lakh tourists reached Srinagar in which 84 per cent were from India and 16 per cent from outside of India.

The arrival of tourists is closely influenced by the prevailing political conditions of the State. The flow of tourists had been significantly high from 1975 to 1982. In each of these years the Valley was visited by more than five lakh tourists. The maximum number of tourists, 6.5 lakhs came in the Valley in 1981. It is interesting to note that the optimum number of foreign tourists (60,000) came in the State in 1978 (Fig. 16).

On the average about 42 thousand non-Indian tourists visit the Kashmir and Ladakh Divisions. Most of the foreign-tourists come from U.S.A., U.K., France, W. Germany, Australia, Spain, Italy, Switzerland, S. Africa, Canada, Japan, Netherlands and Newzealand (Fig. 17). The average number of non-Indian tourists has been given in Table 9.5. The figures given are the averages of four years i.e. 1981-84.

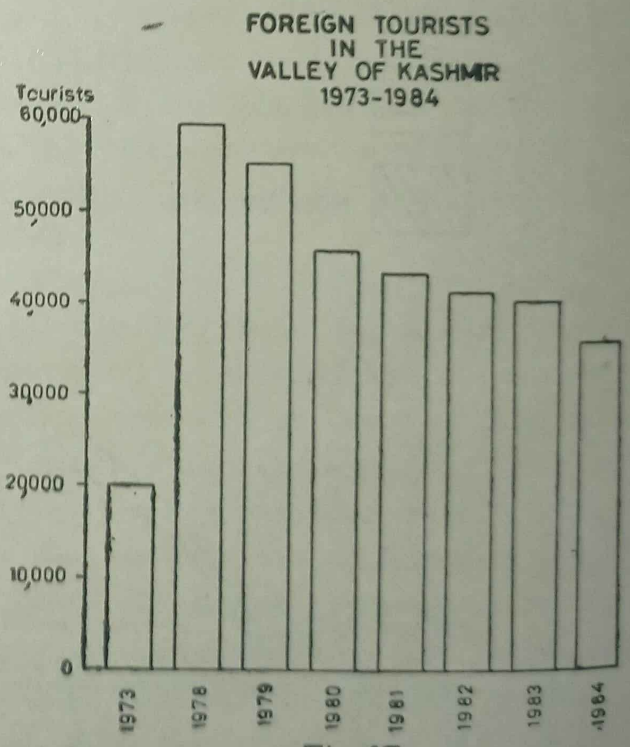


Fig.17

Table 9.5

No. of Non-Indian Tourists (Country-Wise) Visiting Kashmir 1981—1984

Country	Persons in Thousand	Percentage to total non-Indian tourists
U.S.A.	7.00	16.70
U.K.	6.13	14.60
France	4.40	10.50
W. Germany	3.61	8.61
Australia	3.30	7.87
Newzealand	1.49	3.55
Italy	1.43	3.41
Spain	1.40	3.34
S. Africa	1.38	3.29
Canada	1.02	2.43
Switzerland	1.00	2.40
Japan	0.94	2.24
Netherlands	0.75	1.80
Belgium	0.72	1.72
Malaysia	0.40	0.95
U.S.S.R.	0.37	0.88
Sweden	0.33	0.80
Iran	0.27	0.65
Others	5.97	14.26
Total	41.91	100.00

Source : Department of Tourism, J & K

Nearly 60 per cent of the total non-Indian tourists are from U.S.A. (16.70%), U K. (14.60%), France (10.50%), W. Germany (8.61%) and Australia (7.87%), while the remaining 40 per cent come mostly from the countries of North-west Europe, Canada, Japan, Malaysia and South Africa (Fig. 18).

As discussed at the outset the physical and socio-cultural milieu of the State provides immense potentialities fo[illegible]velopment of tourism in the State. Unfortunately, most of the tourists make Srinagar, Gulmarg and Pahalgam as the places of their stay. Consequently, these places become overcrowded during the peak season. The side-valleys of Sindh, Liddar, Pohru, Lolab, and Kishanganga have a large number of beautiful points which can be developed into tourist resorts. Similarly the side valleys of Indus (Ladakh) and upper reaches of Chenab have enormous

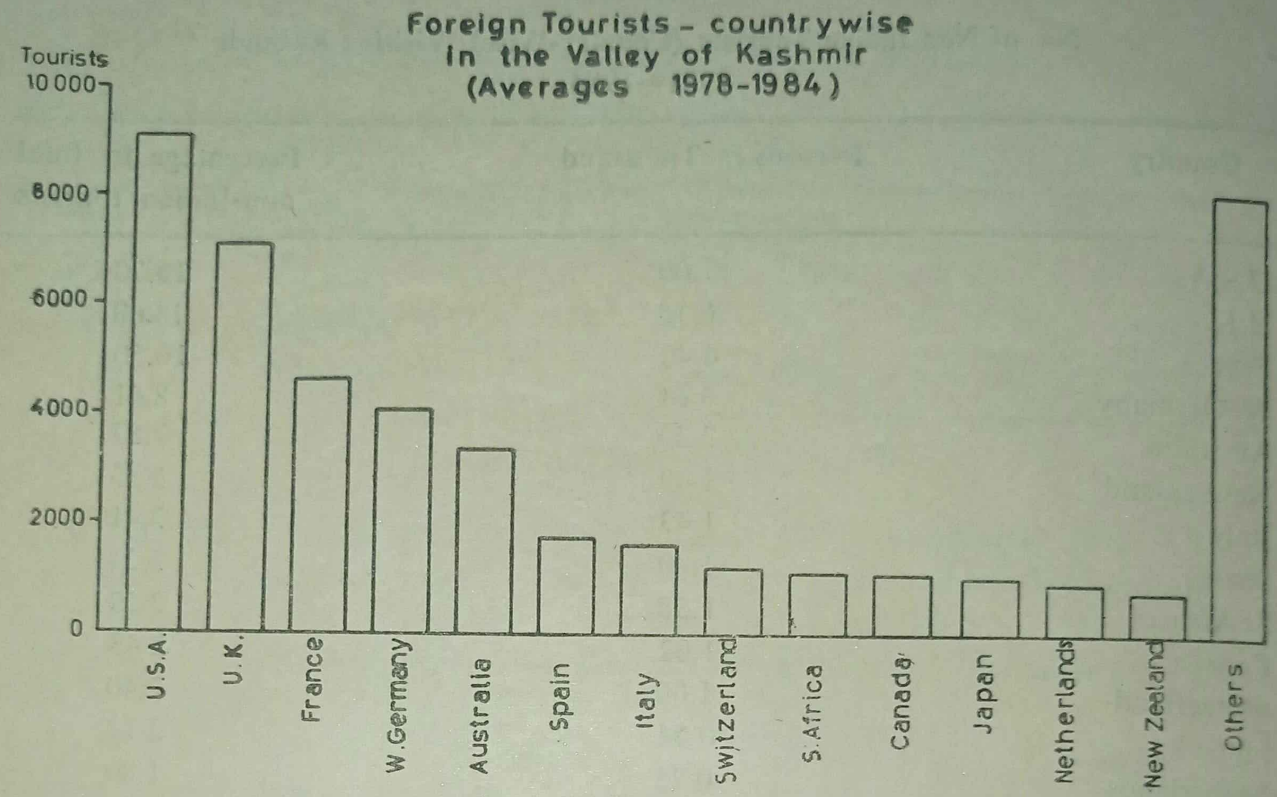


Fig. 18

potentials of tourism development. This industry need a sound long term planning so that the State income may go up and minimum disturbance is caused to the ecosystems of the State.

REFERENCES :

1. M.R. Chaudhury, 1970, *Indian Industries : Development and Location*, Calcutta.
2. Govt. of India, *Industrial India Annual.*
3. Govt. of J & K, 1984, *Digest Statistics.*
4. M. Ahmad, 1984, *Spatial Organization of Tourism Industry in Kashmir with Special Reference to Sindh Valley*, unpuslished, M. Phil dessertation, Univ. of Kashmir.
5. *American Encyclopaedia of Social Sciences.*
6. H.R. Jarrett, 1977, *A Geography of Manufacturing*' London.

19. Gutlibagh—A Good Camping Ground.

20. Gutlibagh—T[illegible]ds and Ravines : A Prospective Resort.

21. Tourists at Chashma—Shahi.

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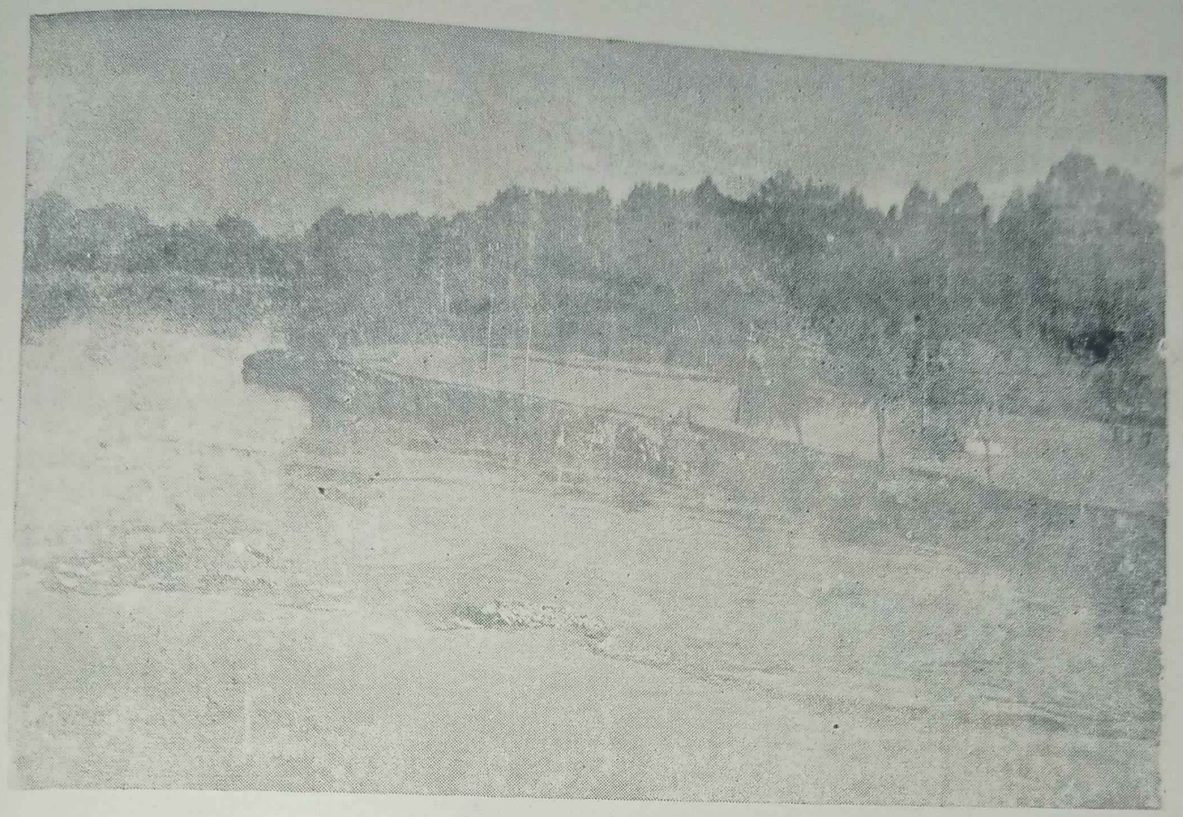
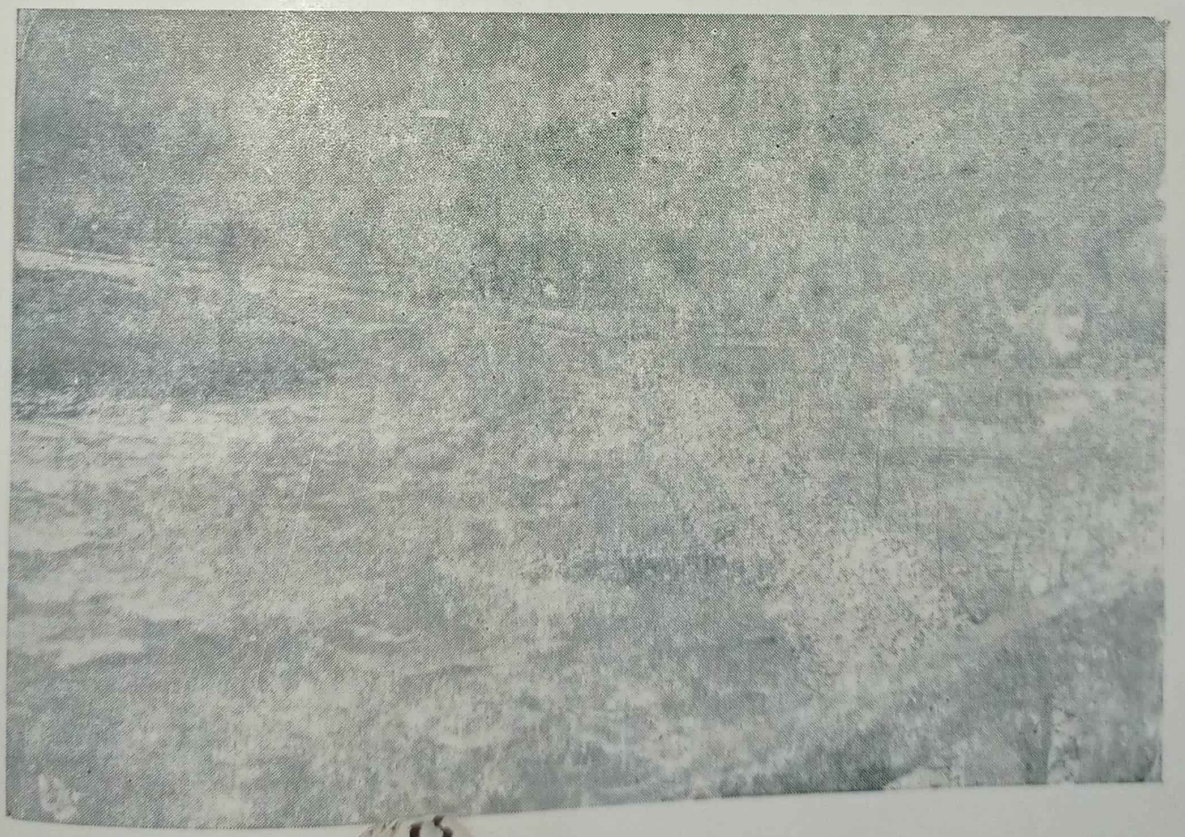


23. Dodarhama—A Place to visit.



Growing Tourist Resort.

CHAPTER – X

Transport and Trade

Development of cheap and efficient means of transport and communications is the prerequisite for the speedy and balanced economic growth. Without an effective network of means of transport and communications, the natural endowment of a region cannot be exploited judiciously. The development of transport, however, depends on physical, historical, technologidal, economic and political factors.

Transportation involves movement of goods, persons, letters, newspapers, as well as the non-physical transfer of information by phone, radio, telex, wireless etc. In brief, transport and communications involve the transfer of people, commodities and information over space. This transfer takes place along a line of communication between two places.

Transportation has always been an important activity of man from the most primitive to the most developed states of the world. It is both a result and a cause of an advancing society. In modern times, development of transportation has reflected the rate of advance of a country. The potential of a country and its transportation is determined largely by mou[illegible]rain, nature of rocks, swamps deserts and thick forests. Such topographic features stretching across mainlines of trade and travel serve as obstacles to land surface transportation Moreover, socio-cultural and eco-political factors also exert great influence in the development of nation's transportation. In fact, commercial and industrial growth stimulates invention and innovation in agriculture, mining and manufacturing which tend to increase demand for transportation. Apart from development of a region, transportation plays a critical role in times of national emergency like war, famines and other natural calamities. Good means of transport and communications are thus necessary for the very existence of a nation.

The State of Jammu and Kashmir is essentially mountainous in character excepting the plains of Jammu and the Jhelum Valley of Kashmir Division. Development of railways through difficult terrains is not only stupendous task, it may be uneconomic and difficult to maintain. The State was brought on the Railway Map in 1970 when Jammu was connected with Pathankot. The total length of railway line in the State at

present is about 80 kms. Apart from Jammu Tawi, Bari-Brahman, Vijainagar, Jammu, Samba, Chagwal, Hiranagar, Chak-Dayala, Chhan-Arorian, Budhi and Kathua are the railway stations in the State on the Jammu-Pathankot Railway Line. Efforts are also being made to connect Udhampur with Jammu on which survey work has been started, and it is hoped that the railway line between these two stations will be completed by the end of 1990. Extension of this railway line beyond Udhampur is not feasible owing to the steep Pir-Panjals and weak rock formations between Batote and and Ramban-known as *Nashiri*, which is often affected adversely by landslides and avalanches. Development of railway line between Jammu and Pathankot has, however, helped appreciably in the movement of passengers and goods. This railwayline is adequately coping with the demand of the region and especially helping in clearing the rush of pilgrims who visit Vaishno-Devi near Katra in the Jammu Division. The Valley of Kashmir which is levelled, highly fertile and densely populated also deserves a network of Railway-lines.

Roads

In a mountainous state over fifty percent of which is almost barren and uninhabited, roads play a vital role in the transportation of people and goods. The State in general and the Valley of Kashmir in particular by virtue of its location and geo-ecological setting, has throughout its long history functioned and prospered as the main focal centre. The Central Asian Trade Route, connecting the Sub-continent with Yarkand, Khotan, Tashkant, Samarkand, Balkh, Bukhara, Ashikabad, Baku, Azerbaijan and Georgia debouched on to it through the Sindh Valley (a tributary of Jhelum) and Indus. The Jhelum was also an important transport artery. The Jammu-Srinagar-Leh National Highway (No. 1-A), the Jammu-Poonch Highway and a number of State roads radiating in all directions have revolutionized the transport of the State. In other words roads provide the most fundamental mode of transport in the State. The roads connect all the 56 towns and cities (Chapter 6) of Jammu, Kashmir and Ladakh Divisions. Moreover, there are roads connecting, towns, villages, factories, farms and mines which provide the required feeder service. In the State, over 80 per cent of surface transport is carried on by roads, while in the Kashmir and Ladakh Divisions roads carry almost 100 per cent of people and passangers.

The national Highway No. 1A, i.e. Pathankot, Jammu, Srinagar, Uri, and Srinagar, Kargil, Leh is maintained by the Borders Development Board. Since the road has been carved out through the weak sedimentary and metamorphic formations, especially between Batot and Ramban (*Nashri* Area), its maintenance is quite expensive. During winters, snow and at the occurrence of snow and rains, heavy landslides occur and parts of the Highway slip into the mighty Chenab river. The Nashiri By-Pass (Neera to Batot) however, provides some relief if there is landslide between Batot and the Chenab Main Bridge. As a result of landslides the Kashmir and Ladakh Divisions temporarily remain cut off from the rest of the country. In winters when [illegible] of vegetables cereals,

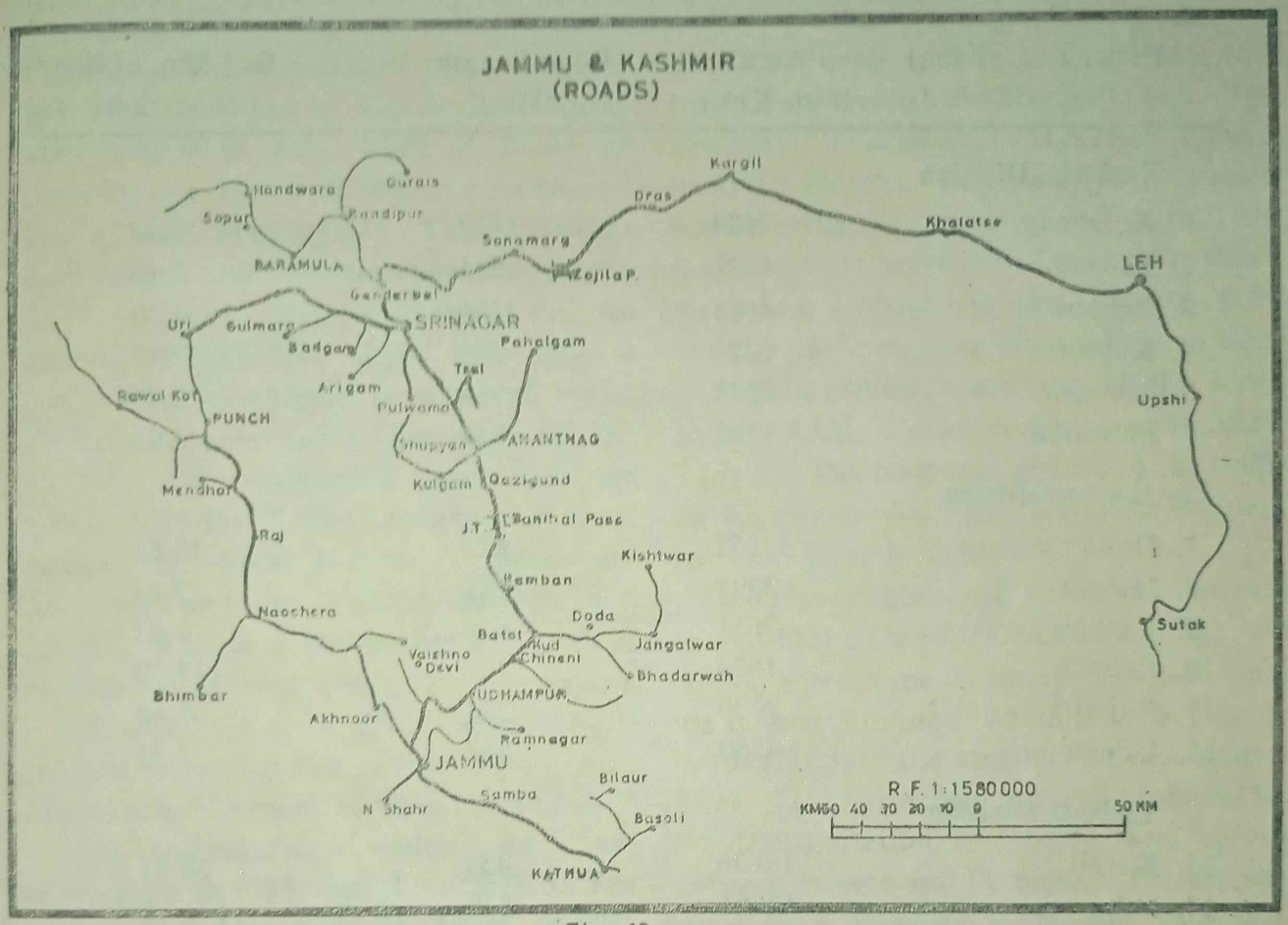


Fig. 19

kerosene, and sheep is disrupted owing to road blocked the people of these Divisions have tough time and life in the Valley becomes miserable.

The Border Roads Organisation has also constructed one of the world's highest road from Manali (Himachal Pradesh) to Leh (Ladakh). The average altitude of the terrain over which this road passes varies 4,875 to 5,485 metres. The [illegible] has considerably reduced the di[illegible]ven Chandigarh and Ladakh.

In Jammu and Kashmir there are a number of State highways. These are the main arteries of trade and commerce, and passanger transport from one Division to another and from one town to another. The maintenance of these roads is the State responsibility. The spatial distribution of roads their length and sq. km. is given in Table 10.1.

Table 10. 1.

Roads - Jammu & Kashmir State

District	Area Sq. Km.	Road Length (km.)	One Km. of Road per sq. km.
Kashmir Division			
1. Anantnag	3984	1199	3.32
2. Badgam	1371	635	2 15
3. Baramulla	4588	1140	4.02
4. Kupwara	2379	556	4.27
5. Srinagar	2228	814	2.73
6. Pulwama	1398	724	1.93
Jammu Division			
7. Doda	11691	627	18.64
8. Jammu	3097	1267	2 44
9. Kathua	2651	624	4.25
10. Poonch	1674	125	13.39
11. Rajouri	2630	354	7.42
12. Udhampur	4550	547	8.31
Ladakh Division			
13. Kargil	14036	454	30.91
14. Leh	82665	578	143.02
Total	138,942	9644	28.81

Source : Digest of Statistics, J & K. 1984.

The Cnteal and the State Government have shown appreciable interest in the development of National, State and District roads. The condition of most of the State and district roads leaves to desire. The spatial distribution of road is highly uneven. The total length of road is 9,644 kms. (Table 10. 1) and on the average there is 1 km. metalled road after every 29 kms. The plain areas have dense road network, while the hilly and mountainous settlements are not well connected by roads. The districts of Pulwama, Badgam, Srinagar and Jammu have one km. road after every 2.75 sq km. area. The levelled topography and dense population of these districts have helped in the development of an elaborate network of roads, as the construction and maintenance of roads under such geographical condition is easy and cheap In the districts of Anantnag, Baramulla, Kupwara, Kathua, and Ra[illegible] which have partly hilly and

partly plain areas about 7 sq. km. or less area has one km. of road. Contrary to this the hilly districts of Leh, Kargil, Doda and Poonch have very poor network of roads. In Leh one km. of metalled road is available after every 143 sq. kms. and in Kargil after every 40 sq. kms. while in Doda on the average every 19 sq. km. of area has on km. of road (Table 10.1). These districts have rugged and mountainous topography and are most sparsely populated. An analysis of Table 10.1 shows that only a few districts have dense network of roads. The development and maintenance of the district roads (connecting towns and large villages with the district headquarters) is not satisfactory. Many of them at places are unsurfaced and are without culverts and bridges. Extension and proper maintenance of state and district roads are imperative for all round economic development. Agricultural marketing will particularly improve with the development of these roads.

The total number of vehicles on roads in the State in 1983, was about 25,915. The number and frequency of buses, trucks, taxis, cars, jeeps, auto-rickshaws, scooters, vary from road to road depending on the demand of population and goods. The Jammu Srinagar National Highwey (No. 1-A) is however, one of the most busy routes of the country. On the average about 800 buses (public and private) and trucks pass through the Banihall Toll Post everyday. This number varys from summer to winter months. For example, in winters occassionally the road is closed under the impacts of ice, snow and heavy rains which may cause landslides in the *Nashiri* Tract and the traffic may remain suspended, while during the summer season upto 2000 buses and trucks may pass through the Jawahar-Tunnel. The temporal growth in the traffic on the Jammu-Srinagar National Highway has been given in Table 10.2.

An examination of Table 10.2 reveals that in 1951 only 16,000 vehicles (buses and trucks) entered the Kashmir Division from the Jammu Division which rose to 132,000 in 1984. In fact, the construction of Jawahar-Tunnel has provided a great stimulus for the transportation of people and goods between Jammu and Srinagar. The vehicles going from Srinagar to Jammu have been given in Table 10.3.

Table 10.2

Traffic passed through Banihal Toll Post Vehicles coming Jammu to Srinagar.

Year	Buses/Trucks	Others	Total
1951	16,000	———	16,000
1961	46,000	2000	48,000
1971	78,000	8000	86,000
1981	1,23,000	15,000	1,38,000
1984	1,27,000	15,000	1,32,000

Source : J & K, Transport Deptt. Srinagar.

Table 10.3
Vehicles going from Srinagar to Jammu, 1984

Year	Buses/Trucks	Others	Total
1951	16,000	———	16,000
1961	45,000	3,000	48,000
1971	73,000	3,000	76,000
1981	126,000	19,000	145,000
1984	121,000	15,000	136,000

Source : J & K Transport Deptt. Srinagar.

In 1984 about 1.36 lakh vehicles passed through the Jawahar Tunnel from Kashmir Division to Jammu Division. Out of the total vehicles 1.21 lakh were buses and trucks and 15 thousand taxis and others. Table 10.3 further shows that there is a phenomenal increase in the traffic, passed through the Banihal Toll Post, the maximum vehicles passed through the Tunnel in 1981 being 1.38. This year was politically most stable which attracted a large number of tourists in the Valley. With the passage of time the flow of traffic is expected to increase stupendously. To cope with the situation it is imperative to expand the National Highway (No 1-A) so that the journey for tourists and passangers may be made more comfortable and mishaps in the Nashiri tract may be avoided.

Air Transport

In a state characterised with mountains, forests and cold desert, development of railways and roads is difficult and expensive. The remote areas of the State of Jammu and Kashmir are not easily accessible. Under such geo-ecological conditions air-transport plays an extremely important role. The importance of airways increases in the times of emergency like wars, epedemics, famines, devastating floods, snowing and heavy avalanches. The development of airways, however, has been largely constrained by population agglomerations and weather. In particular poor visibility and snowing hinder air-transport in the State.

Both the capitals i.e. Jammu and Srinagar and the Divisional Headquarters of Ladakh (Leh) are on the Air-Map of the country. The Indian Airlines connects the airports of Jammu, Srinagar and Leh. Everyday, there are several flights from Delhi to Srinagar. During the tourist season Delhi-Srinagar remains as one of the most busy air-routes, while on the Jammu-Srinagar roure there is heavy rush throughout the year, especially during the winter season, when the National Highway No. 1-A is affected adversely in the Nashiri Landslide Tract (Batote-Ramban). The Srinagar-Jammu cities deserves more flights and especial subsidy to provide more comfort to the people of the State and the tourists.

Though after independence a spectacular progress has been made in road, railway and air-transport in the State, the situation is still far from satisfactory. Both the road trafic and Indian Airlines are under constant pressure. The transport is quite inadequate to meet the traffic requirements

of the people of the State and the tourists coming from the various parts of the country and abroad.

Trade

The State of Jammu and Kashmir is essentially an agrarian state in which most of the people are directly or indirectly dependent on forestry, cultivation of crops, sericulture, horticulture and apiculture. Consequently, the State exports a large variety of agro-based and forest based products. Being poor in minerals, imports of machines chemical products and electric goods is made in the State. The major items exported from the State are given in Table 10.4.

Imports

The principal commodities which the State imports include machinery, iron and steel, electric goods, petroleum, fertilizers chemical elements and compounds, non-ferrous metals, vehicles, petroleum products, paper and paper board, rice oilseeds, sugar, textile goods, coal-tar, dyestuff etc. The quantity of the goods imported is given in Table 10.5.

Table 10.4

Jammu & Kashmir State—Goods Exported 1983-84

	Commodity	Quantity
1.	Fruits, apples, pears, cherry, others.	4,385,270 qtls.
2.	Wood and Wood products	2,043,920 qtls.
3.	Gums and resins	175,260 qts.
4.	Metals	162,570 qts.
5.	Dry fruits (almond, walnut etc.)	76,100 qtls.
6.	Hides and skins etc.	46,950 qtls.
7.	Glass and Glass wares	29,760 qtls.
8.	Rubber goods, tyres & tubes	25,420 qtls.
9.	Turpentine oil	25,140 qtls.
10.	Fibres	11,060 qtls.
11.	Cotton and cotton products	10,990 qtls.
12.	Wool and wool products	8,890 qtls.
13.	Provisions	4,590 qtls.
14.	Papier-mache	1,170 qtls.
15.	Miscellaneous goods★	1,820,040 qtls.
	Total	8,827,040 qtls.

★Miscellaneous goods include *Anardans*, seeds, bones, drugs, medicines, honey, vegetables, grains, cement, lime, chalk, marble, gypsum, paints, varnish, oilseeds, silk goods, stationery, embroidery [illegible]s, cigarettes, tea, fur goods and animals.

Table 10.5.

Jammu and Kashmir State—Good Imported 1983-84

	Commodity	Quantity
1.	Grains and pulses	3,323,310 qtls.
2.	Minerals rocks and their products.	2,418, 240 qtls.
3.	Petrol, diesal, mobil-oil Air-trans fuel etc.	1,366,520 Ltrs.
4.	Living animals (sheep etc)	1,082,807 No.
5.	Cotton and its products	208,580 qtls.
6.	Iron & its products	819,370 qtls.
7.	Vegetables	549,110 qtls.
8.	Fodder	367,800 qtls.
9.	Coal and Coke	319,930 qtls.
10.	Fruits	245,330 qtls.
11.	Electric goods	113,120 qtls.
12.	Drugs and medicines	111,140 qtls.
13.	Lather and its products	106,800 qtls.
14.	Provisions, milk powder, butter, *ghee*, dalda	333,920 qtls.
15.	Stationery, books etc.	135,110 qtls.
16.	Salt	197,220 qtls.
17.	Silk & its products	192,220 qtls.
18.	Sugar, molasses and their products	516,780
19.	Oils and their products	729,880
20.	Urea	487,190
21.	Miscellaneous goods★	2,617.590
	Total	2,615,295

★Miscellaneous goods include apparel, asphalt, crockery, paints and varnishes, fibrous goods, glass and glass ware, herber dashry, liquirs, vehicles (2295), motor spare parts, oilseeds, tea, rubber products, wool and its products, soaps, perfumery and cosmetics, hoisery goods, spices chillies, tobacco products, military load, sports goods, wood and timber, music goods, L.P. Gas etc.

It may be seen from Table 10.5 that grains, pulses, minerals, petroleum, living animals, cotton goods, iron and steel, vegetables, fodder, coal, electric goods, drugs, milk and milk products, books, sugar, salt, urea and stationery are importated in the State from Punjab, Harayana, Gujarat Rajasthan, Uttar Pradesh and other parts of the country. It may also be noted from Table 10.5 that the people of the State are largely dependent for a large quantity of essential goods on import from the neighbouring states. The State has been striving consist[illegible] for the expansion and divsrsi-

fication of its exports. A series of measures have been put into operation which cover finance for export, assistance and incentives, transport facilities, training, market research and rationalization of institutional arrangements and technical services. Despite many incentives the process of export is slow and most the goods are exported as raw materials. A pragmatic policy is to be followed to enhance the export of processed goods from the State.

REFERENCES :

1. H.P. White and M.L. Senior, 1983 '*Transport Geography*, Longman, New York.
2. H. Robinson and C.G. Bamford, 1978 '*Geography of Transport*' Macdonald & Evans, Playmoryth.
3. H.R. Jarret, 1977 '*A Geography of Manufacturing*' Macdonal and Evans, Playmouth.
4. T.C. Sharma, et. al. 1977, *Economic and Commercial Geography of India*' Vikas Pub. Co. New Delhi.
5. P.N.K. Bamzai, 1980, *Kashmir and Central Asia*, Light and Life Publishers, Trivendrum.
6. National Council of Applied Economic Research (1969), *Techno-Economic Survey* of J & K, New Delhi.

BIBLIOGRAPHY

Agarwala, S.N., 1972, *India's Population Problems*, Delhi.

Ahmad, M. 1985, '*Spatial Organisation of Tourism in Kashmir State with Especial Reference to Sindh Valley*' Unpublished M. Phil. Dissertation, University of Kashmir.

Aiyer, N.P.K., 1968, '*Field Crops of India*, Bangalore.

Alam, S.M., Dunkerly Joy, et. al., 1985, *Fuelwood in Urban Markets*, Concept Pub. Co. New Delhi

American Encyclopaedia of Social Sciences.

Bali, U.S., 1982, Encroachment of Forests in the Jhelum Valley, Kashmir, Unpub. M. Phil. Dissertation, Univercity of Kashmir

Bates, C.E. '*A Gazetteer of Kashmir, Jammu*,' p 1.

Bhan, S.N., 1956, 'Snowfall at Srinagar '*Indian Jour. Met. Geo-Physics*, VII, pp. 295-300.

Bhat, S.A., 1983, Regional Structure of Kashmir Division, Unpublished M. Phil, Dissertation, Kashmir University.

Bose, S.C., 1968, *Land and People of the Himalayas*, Indian Pub. Caloutta, p.198

Buchanan, R.O., 1974, *An Illustrated Dictionary of Geography*, Mc.Graw Hill, Singapore.

Burrad, S.G., 1933, '*A Sketch of the Geography and Geology of the Himalayas and Tibet*, Pt. III, Delhi

Chaudhry, M.R. 1970, *Indian Industries : Development and Location*, Calcutta

Census of India 1971

Census of India 1981, Series 8-Jammu and Kashmir, Provisinal Population Totals

Davis, D.H., 1948 '*The Earth of Man*' New York

Dept. of Geology & Mining, *Bulletin*, 1983

Digest of Statistics, Jammu and Kashmir, 1984

Drew, F. 1971 '*The Territories of Jammu and Kashmir*, Stanford, Delhi

Dutta, M., 1985, 'Transport Network Efficiency—A Comparative Analysis Between Jammu and Kashmir Divisions' *Geography of Jammu and Kashmir*, edt. M. Husain, et. al. Ariana Pub. New Delhi

Dutta, R.K, and M.G. Gupta, 1967 'Synoptic Study of the Formation and Movements of the Western Depressions' *Ind. Jour. Met. Geo-Physics*, XVIII, pp. 45-50.

Flohn, H., 1958, 'Recent Investigations on the Eastern Asia' *Monsoons of the World*, IMD, New Delhi.

Gazetteer of Kashmir and Ladakh, 1890, Reprinted in 1974 (Vivek, Delhi).

Govt. of India, *Industrial India Annual*

Govt. of India, *Irrigation and Power Projects*, Ministry of Power and Irrigation, New Delhi-1970.

.....1970, *Irrigation Atlas of India*, Ministry of Irrigation and Power, New Delhi

Govt. of Jammu and Kashmir State, Digest of Statistics, Srinagar.

Hashia, H. 1986, Seasonal Migration of Kashmiri Labour, Unpublished M. Phil Dissertation, University of Kashmir

Mir., G.M., 1982, '*Impact of Saffron Cultivation on Socio-Economy of the Kashmir Valley*, Unpublished M. Phild Dissertation, University of Kashmir, Srinagar

Husain, M., 1977, *Human and Economic Geography*, NCERT, New Delhi

.....,1979, *Agricultural Geography*, Inter India Pub. New Delhi

.....,1985 'Major Ethnic Groups of Jammu and Kashmir' *Geography of Jammu and Kashmir*, edt. M. Husain et. al., Ariana Pub, Co. New Delhi.

Imperial Gazetteer of India, 1908, Vol. XV, London.

Indian Council of Agricultural Research, 1970, *Handbook of Agriculture*, New Delhi

Jarrett, H.R., 1977, *A Geography of Manufacturing*, London

Kachroo, P. 'A Note on Flora of Kashmir' *Geography of Jammu and Kashmir*, edt. M. Husain et. al., New Delhi.

Kanth, T.A., 1985 'Statigraphic Profile of Jammu and Kashmir' *Geography of Jammu and Kashmir*, edt. M. Husain, et. al. New Delhi.

Kendrew, W.G., 1961, *The Climate of the Continents*, Oxf. Univ Press, London.

Khatana, R.P., 1985, 'Gujara and Bakarwal Transhumance in Jammu and Kashmir Himalayas: Responses of Spring Migration' *Geography of Jammu and Kashmir*, edt. M Husain, et. al. New Delhi.

Koul, A.K., 1985, *Home Geography Jammu and Kashmir*, Srinagar

Koul, H.N., 1958, A Survey of Origin of People of Kashmir, *Kashmir Today*, Vol. II, Srinagar.

Koul, M.K., Gujjars the Hordes of Jungles, *Kushmir Today*, Vol. IV, pp. 7-8.

Koul, V.H, Dar, 1985, 'Changing Vegetation of Kashmir' *Geography of Jammu and Kashmir*, edt. M. Husain et. al. New Delhi

Kumari, V., 1968, *The Nilmat Purana*, Vol. I, Jammu, pp. 23-24.

Lawrance, W.R., 1967, *The Valley of Kashmir*, Srinagar.

Lidhoo, M.L., 1985, '*Gujjar—Their Attitudes Towards Social Changes-Education and Modernization*, Unpublished Project Report, pp. 2-12.

Mam. A , 1984 *Hanjis of Dal Lake*, Unpublished, M. Phil Dissertation, University of Kashmir. Srinagar.

Moh. A , 1982, Regional structure of Jammu Division, Unpublished M. Phil Dissertation Univ. of Kashmir.

Monkhouse F.J., et. al., 1973, *A Dictionary of Natural Environment*, London.

Morgan, et. al. 1973, '*Human and Economic Geography*, London

Mooley, D.A., 1957, The Role of Western Disturbances in the Production of Weather Over India during Different Seasons *Ind. Jour. Met. Geo-Physics*, VIII, pp. 253 260.

National Council of Applied Economic Research, 1969, *Techno-Economic Survey of Jammu and Kashmir*, New Delhi.

Pathik, J , 1980. *Cultural Heritage of Dogras*, New Delhi.
Plyurnin, *Reclamative Soil Science*, New Delhi.
Ray, S.C., 1970, Early History and Culture of Kashmir, pp. 26-34.
Raza, M. et al. 1978, *The Valley of Kashmir*, New Delhi.
Raina, A.N. 1971, *Geography of Jammu and Kashmir*, New Delhi.
Rookhrub, L., *Race and Tribes-Culture of Kashmir*, New Delhi.
Shahi, S.S., *The Nomads of Himalayas*, Delhi.
Sharma, T.C., O. Coutinho, *Economic and Commercial Geography of India*, Vikas Pub. Co., New Delhi.
Stein, M.A.. 1976, *Kalhan's Rajtarangani*, p. 386.
Siddique, M., 1986, Urbanization in Jammu and Kashmir, - A Regional Analysis, *Geography of Jammu & Kashmir*, edt. M. Husain et. al. Ariana Pub. Co. New Delhi.
Sufi, G.M.D., 1979, *Islamic Culture in Kashmir*, New Delhi.
Symon, L., 1974, *Agricultural Geography*, London.
Wadia, D.N., 1926, *Geography of India*, Macmillan, London.
White, H. P. and M. L. Senior, 1983, *Transport Geography*, London.
Zutshi, B., 1985, 'Population Distribution of Jammu and Kashmir-A Regional Analysis' *Geography of Jammu & Kashmir*, edt. M. Husain et. al. Ariana Publishing Co. New Delhi